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ESSAYS ON THE
NATURAL ORIGIN OF THE MIND



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ESSAYS
ON THE
NATURAL ORIGIN OF THE MIND

BY
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PREFACE

THE first four of these essays have already appeared as articles in *Mind*, and my thanks are due to the editor of that periodical for permission to reprint them.

I have rewritten parts of the four, especially of the first and third, in a way which, I hope, makes my general position clearer, and have altered the titles of the first three, so as to avoid the use of the equivocal term "appearances". Distinguishing, with Mr. Santayana, "intuition" from "intent", I now speak of the datum of intuition as the "sense-datum."

The other four essays are new, and I have added an Introduction explaining the object of the entire series.

I am indebted to Mr. Daniel Cory for useful suggestions as to the wording of many passages.

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INTRODUCTION

THE object of science is to dispel the mystery of things ; for things are not in themselves mysterious. Wherever mystery clings to our conceptions, we may presume that they are in some undiscovered respect erroneous. We shall, indeed, arrive in the end at ultimate facts, of which space, time, and the nature of the real are examples ; but with our arrival at them, mystery ends ; since an ultimate fact simply *is*, and has no explanation. We should not be hasty, however, in concluding that anything is an ultimate fact, or give up the hope of explaining it unless we are able to deduce it from space, time, and the nature of the real.

To most men the connexion of mind and body is mysterious ; animals would wonder at it if they could reflect. Yet a relation so obviously natural must be capable of explanation. If our conceptions of matter and of mind were free from error, we should be able to understand it.

The origin of the mind is another case in point. It follows from the theory of evolution that the mind has been brought into being by the same natural processes which have produced the body. No one who considers how consciousness returns after sleep,

or how a human being develops out of a speck of protoplasm, can fail to recognise that living matter, at least, is constantly giving birth to minds. And when we reflect that there was a time when the earth was molten, it must appear overwhelmingly probable that life, with mind, came originally out of lifeless matter.

If the mind is a natural product, it must be possible to explain how it comes into being. There is no reason why this problem should be regarded as insoluble. If matter seems to us a sort of thing out of which a mind could not possibly arise, are we not perhaps failing to distinguish between matter as it appears to our senses and matter as it really is ? If the mind seems to us a thing that cannot have come out of matter, may it not be because our conception of the mind is in some respect faulty ?

In the following essays an attempt is made to construct an evolutionary psychology. By this I mean such an analysis of the mind, and such an account of the ultimate elements of which the world consists, as shall permit us to understand how the mind can arise naturally.

In the effort to free our ordinary conceptions of matter and of mind from their alloy of error, I shall be obliged to take issue with some widely prevalent tendencies in contemporary philosophy, and to ask the reader to make sharply a number of unfamiliar distinctions ; but I think I can promise him in return a theory of the origin of the mind which, though it may not be the true one, will at least be

intelligible. Any philosopher who feels that he does not fully understand why consciousness returns when we wake up in the morning will, I am sure, give me an unbiased hearing.

Success in this attempt will depend on two essential conditions. First, we must re-conceive matter in such a way that mind can intelligibly come out of it. Recent physics has taken a short but definite step in this direction, by its substitution of the conception of energy for the earlier conception of matter. Matter, as it used to be conceived, was something so opposite to mind in its nature, that the origin of mind out of it was not so much difficult to think as plainly impossible. Not, of course, that the "energy" of the physicist is as yet in any way distinctively mental. A further step is taken when it is recognised, as it is by the more philosophically minded physicists, that physics does not attempt to define the intrinsic nature of the existent which it calls energy, but only to describe the relations of its parts.

This modest attitude on the part of the physicist is dictated, it is true, by a realistic conception of energy—but most of us believe that the stars really exist outside us—and amounts to a suggested rehabilitation of the distinction between things as they appear and things as they really are. I confess that I cannot develop my theory unless I am allowed to make this distinction. And certain facts about the function, sense-perception, by means of which our knowledge of physical things is obtained tend to show that the distinction, properly stated, is a valid one. I will

mention two. It must be obvious to any reader of contemporary books on atoms how extremely far sensible experience is from conveying an adequate idea of the constitution of the objects it presents ; how immensely simplified, unified, and in some respects altered apparent things are as compared with the real things of which they are the vague perception. But if sense-perception gives an altered picture of the real, hiding from us its minuter parts and their relations, may it not also hide its nature—that nature which permits it to give birth to minds ? Secondly, no use of our senses could possibly acquaint us with the fact that other men and animals have feelings. This is not because we cannot explore their bodies ; for, even if we could do so completely, the existence of the feelings would still be hidden from us. A being who had no faculty but sense-perception could never suspect the existence of such things as feelings. Feelings are in some way bound up with processes in the nervous system : when we observe these processes, and cannot observe the feelings, is it not a reasonable supposition that the feelings are the existent or a part of the existent which appears to us as the nervous process ?

The main contribution, however, towards bridging the gulf between matter and mind must come from the side of psychology. This is the second essential condition of an evolutionary theory of the mind.

Psychology, despite the vast amount of excellent work that has been done, remains as respects theory in a state of confusion because its fundamental con-

ceptions are not clear. It is still, as William James said many years ago, not a science but only the hope of one. In the dim light of its impalpable facts, the one thing that stands out clearly is the existence of a correlation between mental states and events in the nervous system. No one who has sought in a truly scientific spirit to unravel the complexities of our mental life, availing himself of all possible sources of information about it, can have failed to discover that the hope of psychology ever becoming a science lies in its keeping in close touch with neurology. The structure of the nervous system must supply the ground-plan of the mind, its functions must furnish the key to the mind's activities. It is impossible to understand the mind aright by contemplating it from within.

But what has not as yet been generally recognised is that the same physiological method, on which the hope of a scientific psychology depends, may be applied also to the problem of cognition, both perceptive and introspective, and so yield a theory of knowledge which shall be equally scientific. The physiological method in psychology consists in studying the relations between nervous processes, and transferring them without change to the relations between the corresponding mental states. If feelings are the existent or a part of the existent which appears as the total nervous process, this method is evidently legitimate. Now in perception there are physical relations between nervous processes and objects outside the body; and the method, here, will consist in transferring

these relations, which *qua* physical are only apparent, to the real relations between feelings and external things. In introspection, again, if it is memory of a feeling just past by means of a present feeling, the physical relations between the nervous processes accompanying these two feelings may be transferred to the cognitive relation between the feelings in such a way as to make it intelligible.

Thus, as the study of nervous processes may furnish the key to the proper analysis of mental states, so consideration of the relations between nervous processes and external objects may help us to understand correctly the nature of sense-perception; and study of the nervous processes accompanying awareness of our feelings may throw light on the nature of introspection. Surely it is folly, in investigating sense-perception, to ignore the fact that *we* are present and perceive only by means of effects produced on our bodies, and to confine oneself to analysis of the sense-datum. Berkeley and Hume would not have been led to their idealistic and sceptical theories had they taken account of the physiological concomitants of perception.

In its application to cognition, since external things as well as nervous processes have to be considered, this has been called the "physical" method. Most philosophers nowadays employ it to some extent, without fully realising its possibilities. I believe that, by employing this method thoroughly, we can reach a conception of the mind which shall permit us to explain its origin.

I will now state briefly the chief results to which a thorough employment of the physical method leads.

There is a clear distinction between events in the nervous system simply as physical occurrences, and the adjustments to the outer and inner environment which they effect—such adjustments as the search for and digestion of food, or protection of the organism from injury. Only the former are motions of matter while the latter are complex relations to the environment deserving the name of *functions*.

Employment of the physical method leads to the proposition that there is a similar distinction between the self, composed of feelings as the nervous process is composed of motions of matter, and the activities of the self, such as perceiving, remembering, desiring, which are essentially functions. This is the fundamental proposition on which an evolutionary psychology must rest.

Secondly, as the motions of matter composing the nervous process are useful to the organism by adjusting it to the environment, so the functions of perceiving and remembering must consist in a *use* of feelings by the self they compose to bring external things or past things before it.

Thirdly, it follows from this that there will be a distinction between external things or past things as they are made to appear to the self by the use of feelings to cognise them, and these things as they really are. Knowledge of the external or of the past will depend on the assumption that things appear to some extent as they really are.

Fourthly, it follows likewise that there will be a distinction between the report feelings give when they are used for cognition, that is, the vision of the external or of the past that rises before us, and these feelings as existents—or, in other words, between apparent things and the self to which they appear.

Finally, if all cognition depends on a use of feelings, it may be necessary to apply these same distinctions to our knowledge of feelings.

Employment of the physical method, in short, shows the necessity of distinguishing between (1) the self, as a whole composed of feelings; (2) its functions, or activities, which consist in a use of these feelings; (3) other things as they are made to appear by this use; and (4) other things as they really are.

The situation in cognition is thus much more complicated than philosophers have been in the habit of supposing. If they have failed hitherto to understand the nature of consciousness and its relation to the physical world, it is because they have not made these distinctions and have confused the different categories with one another.

The present confusion of psychological theory is due to treating the first three kinds of fact: (1) feelings, (2) functions or activities, (3) apparent things, as “mental” or “psychical” in the same sense, and using some blanket term, such as “consciousness” or “experience”, which covers them all without distinguishing them; in disregard of the fact that they belong to entirely different categories. This fact

becomes evident when we consider that they are known by means of three different forms of knowing. Apparent things are known in perception, or whatever the form of cognition may be, where they are automatically identified with real things ; they are known as distinct from real things only in reflection, in so far as we doubt whether the thing really was as it appeared to be. Feelings are known only in introspection. Functions or activities, as will shortly be made clear, are not data of experience at all, but are known constructively after the fact, by putting together in thought the object known, say, in perception or memory and the self composed of feelings which was the subject ; this self having been previously cognised in introspection.

James took the essential step needed for ending this confusion when he denied that "consciousness" exists, but retained it as a function. This seems to me the most important event that has happened in psychology for years ; it involves philosophical consequences the full extent of which is as yet far from being appreciated. The best word for what James is talking of is *awareness*. It had always been assumed that awareness, while revealing things of various sorts, also revealed or might reveal itself—that it was a possible datum of introspective observation. Consciousness in this sense was formerly looked upon as the activity of a Soul (the capital letter may serve to indicate a simple and indivisible being) ; but psychologists, unable to discover among apparent things any entity to which they could give

this name, proceeded to construct out of none but apparent materials a "psychology without a Soul"—a psychology with only consciousness. Consciousness was supposed to be an undeniable though not very obvious datum. Now James comes, and, after many years of careful observation and search for a datum of experience which he could call "consciousness" or "activity" (he uses the two terms synonymously), declares that no such observable datum exists.

James was absolutely right that there is no such existent and no such observable datum as "consciousness" in the sense of awareness. He made his discovery innocuous by retaining consciousness as a function—for no one doubts that there is a difference between being unconscious and being conscious. Unfortunately he worked out his conception of the nature of this function only in the case of awareness of *absent* things—the reader will recall his example of the thought of Memorial Hall—but did not explain how we can be aware of present things, nor even recognise that the perception of present things involves awareness. On the contrary, his rejection of "consciousness" as an existent led him to take up in regard to present things a purely phenomenalist position (to which he was already inclined by the element of British empiricism in his philosophy), and to reduce the perception of them to the mere being of the apparent—the third kind of fact mentioned above, without the other two. But why must there be a function of awareness distinct from that of which

we are aware when we think of absent things, and no function of awareness similarly distinct when we perceive present things? Are we not as acutely aware in the latter case as in the former? Is not this awareness something that supervenes upon and is added to the existence of the things? There is evidently a problem here which James has not solved, and which, it is to be feared, his phenomenism has made it impossible for him to solve.

Let us see whether light cannot be thrown upon this problem by the use of the physical method. To evoke a perception of itself, an external thing must act on the organism and call forth in it a physical impression. This impression is a material occurrence in the sense-organ and the sensory part of the brain; an occurrence which, simply as a motion of matter, is nowise concerned with the external thing that called it forth, though it bears the pattern of this thing in its substance. To this sensory nerve-process there corresponds what in these essays I shall call a *sensation*, though I must warn the reader at once that I do not mean by this term what is ordinarily meant by a sensation, namely, awareness of a quality; what I do mean can only be explained as we proceed. It follows, by the physical method, that this sensation, considered in itself, is unconcerned with the real thing whose pattern it bears, and is simply a state of the being inhabiting the organism, the self, a state of his sensibility.

But now the organism is led by the sensory nerve-process to react—the sensory process evokes a process

in the motor part of the brain, and this in its turn a contraction of the muscles, by which the organism is adjusted to the external thing; each particular kind of sensory process evokes a motor process appropriate to it, or rather a reaction appropriate to the external thing that caused it. So that the sensory nerve-process, in itself a mere motion of matter unconcerned with the external thing, has through the reaction it calls forth become concerned with it, and has indeed served to the automatically reacting organism as the sign of it. Transferring this set of relations again from the apparent to the real, the result we reach is that sensations, in themselves mere states of the self, "blind, windowless, ignorant of what the other things in the universe are and mean", become significant, and through their nature as states of sensibility enable the self to be aware of real things outside it, in so far as the automatically reacting self uses them as signs of these things.¹

Thus the physical relation between the organism and a thing in its environment supplies the paradigm by the aid of which the real relation between the self and

¹ The first impulse to this sensori-motor theory of awareness—the first suggestion that, in order to explain this function, we may have to take account of action as well as of sensation—came to me from James's article on "The Function of Cognition" in *Mind* for January 1885. Cognition, in James's view, is an external function exercised by feeling. A feeling "knows whatever reality it resembles, and directly or indirectly operates on" (p. 38). "Its own nature is not a particle altered by having the self-transcendent function of cognition either added to it or taken away. The function is accidental; synthetic, not analytic; and falls outside and not inside its being" (p. 33). "A feeling feels [knows] as a gun shoots" (p. 34). After many years of incubation on my part, James's idea has at last assumed the form which it takes in these essays.

what it cognises is to be construed. This reasoning, let it be frankly admitted, depends on the assumption that there is a distinction between things as they appear and things as they are, and on the further assumption that feelings are the existent or a part of the existent that appears as the central nervous process. But these are the assumptions on which the present theory of the origin of the mind is based.

By making them, and then employing the physical method thoroughly, we have reached a result very important for our purpose. This is the necessity of distinguishing between *feeling* and *awareness*. It is the most valuable contribution which physiological psychology can make towards an evolutionary theory of the mind. If awareness were an ultimate fact, a magical power of self-transcendence or of contemplation, it could only "emerge", as something wholly new and impossible to account for; but if it is a function, consisting in the use of non-self-transcendent and intrinsically unaware feelings as signs, the task of evolutionary psychology is immensely lightened.

Moreover, this analysis explains why awareness is not a possible datum of observation. A function which is only a use, and analogous to a bodily adjustment, cannot appear sensibly before the mind as a physical object or a feeling can.

Again, when we consider that objects are perceived by means of sensations, we see at once that there must needs be a distinction between things as they are and things as they appear. For the sensation cannot resemble the real thing it is to make us aware of more

closely than the sensory nerve-process resembles the apparent thing.

It remains to apply the physical method to introspective cognition.

If feelings, in themselves considered, are "blind, windowless, ignorant", that is to say, non-cognitive, then a feeling is not known to us, or an object before the self, at the moment of its existence ; it is a mere component *in* the self. In view of what precedes, I may perhaps take it for granted that feelings are known only retrospectively, by means of images that reproduce them or later feelings that continue them, and, further, only by the later feeling or image calling forth a reaction which adjusts us to the earlier feeling. Introspection consists in using a later feeling as the sign of an earlier one. Since the feelings composing the self are brought before it as objects in this way, there will be a distinction between the feeling as it appears and the feeling as it really is, corresponding to the similar distinction in perception. The fact that in introspection a feeling is known by means of another feeling exactly like it will prove a powerful solvent of the well-known difficulty as to the knowableness of things in themselves, and will later be used to prove that, at least as regards their fundamental nature, feelings really are as they appear to be.

This of course is novel doctrine, but not as inconsistent with the ordinary notion of a feeling and the ordinary use of the word as it at first sight appears.

I shall be satisfied if philosophical critics will think the new conception through to the end.

Though James denied consciousness or awareness to be a datum of experience, he did not of course deny that we have experience of anything psychical, for feelings are obvious data. He could hardly deny that in touching, hearing, and seeing we make use of sensations. But he tends to place these in the same category with apparent things (they *are* in the same category *qua* apparent), attaching no importance to the fact that the physical world forms a closed circle and that no place can be found in it for feelings. Thus he glides over the peculiar connexion between them and nervous processes, a connexion which on any phenomenalist theory is inexplicable. He fails to recognise that in perception we are aware only of physical things, yet that sensations then exist without our being aware of them and are the means of our awareness. Sensations are not elements in apparent things, obtainable from them by analysis; they are affections of the self enabling it to contemplate the things. Thus James overlooks the antithesis existing in perception between the things perceived and the states of the self by means of which they are perceived. He is led to the extravagant view that, when I see a table, the table and I who see it (or, more exactly, the part of the table which I see and the part of me which sees it) are one entity. Had he worked out his theory of consciousness as a function in the case of present things, he would not have persisted in his phenomenism and made this identification.

Another important application of the physical method to perception remains to be made. It will help us to see what is wrong in phenomenalism (I make my apologies to phenomenalist readers, but I cannot carry out this evolutionary attempt without controverting their philosophy).

Objects in perception bear a twofold relation to the organism, and it to them : (1) in so far as they call forth sensory processes in it, and (2) in so far as they provoke the organism to a reaction addressed to them. Hence, in the world of which the self is part, a distinction between the sensible picturing of the object, or *intuition*, and the mental reference to it as an existent with which the self has to do, or *intent*.¹

We do not see or touch an object by merely picturing it, but by picturing and at the same time meaning or intending it. We intend it, in so far as we behave with respect to it and have feelings which are reports to the self of our behaviour. Indeed, the real being of a perceived thing, as an existent other than the self, cannot be pictured, but can only be intended or meant.

Intuition and intent are not separate acts, but together form the perceptive act ; they are functional relations entering as ingredients into this act. Intuition shows us in sensible form the character of the object ; intent penetrates to its existence. The one reveals the *what* of the perceived thing, the other its *that*. The datum of intuition, or *sense-datum*, is thus

¹ The clear recognition of this distinction, as well as the appropriate terms, are due to Mr. Santayana.

a sort of predicate, which the perceptive act ascribes to the existent present to intent as subject. Perception is in effect an implicit proposition : it is as if we said, There is an existent whose character is so and so.¹

An insidious tendency, however, due to the fascinating obviousness of the sense-datum, leads philosophers, when they start to analyse perception, to overlook the intent—which alone gives to acquaintance its reference to the real—and to suppose that perceiving consists in the mere presence of a sensible picture. The sensuous being of the picture, which really is the being of the sensation used as a sign—for sense-data, like the moon, do not shine by their own light—and which ceases abruptly when we cease to perceive, is supposed to be the existence of the thing perceived. Or, if it is pointed out that my sense-datum, when I see a distant church, differs markedly from the real church, the latter is supposed to consist of this and other sense-data.

To this defective analysis, this omission from cognition of its soul—its reference to the real—is due the series of phenomenalistic theories which for so long have retarded the progress of philosophy and brought it into general disrepute. A list of these fallacious theories will not be irrelevant to our undertaking.

¹ The sense-datum and the apparent thing are not identical. The apparent thing is the vision of the real thing which arises when the sense-datum is predicated of the existent present to intent—it is the real thing as it then appears. The sense-datum is related to the apparent thing as the ingredient of intuition is related to the total perceptive act. Intuition asserts nothing. The apparent thing is the real thing as the senses assert it to be.

1. The primal fallacy, to which the name of *phenomenalism* is best reserved, lies in mistaking the sense-datum for the immediate object of knowledge. The only object of knowledge in perception is the real thing, which is an existent external to the self. Such an external existent, though known as to its character through the sense-datum, is knowable as to its existence only by intent. When intent is overlooked, intuition, which in truth is only an ingredient of the perceptive act, is conceived to be itself that act, and the sense-datum to be the object immediately known. This primal fallacy is the *fons et origo malorum*, from which the other fallacies follow with logical necessity upon further reflection.

2. At first the conviction, retained by the phenomenalist from his pre-philosophic period, that real things exist externally and are possible objects of knowledge, leads him to assume that the real thing must be known representatively, through an apparent thing which is the sensible picture: either by inference, or by some other mode of knowing, the nature of which is left obscure. This is the fallacy of *representationism*. In truth it is impossible to explain, if we never are aware of anything but sensible pictures and these are the only objects immediately known to us, by what logic we can pass from them to real things of which it is impossible for us ever to be immediately aware.

3. Some consciousness of this soon leads the representationist first to doubt and then to deny real things distinct from sensible pictures, as necessarily

unknowable in that they cannot become pictures and cannot be inferred from pictures. The logic of this denial, if once the phenomenalist premiss be admitted, is irrefragable. Thus the phenomenalist comes to the conclusion that the only real things are these pictures. He conceives the world as consisting exclusively of pictures, present and eventual. Now the presence of sensible pictures is in fact dependent on the self with its sensations, the appearing of things on the subject who must needs be there that they may appear: and if real things distinct from pictures be denied, and only apparent things, identified with pictures, be admitted, a view results which is currently known as subjective idealism or *subjectivism*. It eliminates the external thing but still retains the self.

4. Suppose now that the subjectivist turns his attention from perception to introspection, the form of cognition by which we become acquainted with the self, and applies his subjectivism to this kind of knowing also. Accustomed to conceive objects as merely sensible pictures, he will tend to think of sensations, pleasures and pains, emotions, as only another sort of pictures; and will thus be led to deny that they can constitute or reveal a being (perhaps in space as well as in time) *to whom* things appear. He will think of appearing as the mere being of the sensible; not as enjoyment by a self to whom the sensible is present. In short, the mind for him will be dissolved into a mere stream of phenomena—a theatre, in Hume's expressive image, but without an audience; and Nature too will be a

flux of phenomena that appear to no one. Phenomenalism has now run its full course, and the name of the resulting fallacy is *scepticism*.

5. Universal scepticism is the true logical outcome and inevitable end of the phenomenalist train of reasoning. For, if what is before the mind in perception is a present picture not revealing anything distinct from itself, what is before it in memory, expectation, and thought will also be only a present picture, and therefore incapable of revealing the absent, *even an absent consisting of pictures* : so that the phenomenalist, if he is consistent and true to his principle, has to content himself with the present phenomenon, and cannot look beyond it. But if, through some persistence in him of the natural belief in a larger world, he includes absent phenomena in his circle of vision, forgetful of his principle that the present phenomenon can reveal only itself, and calls these absent pictures real things, he commits a fallacy the most suitable name for which is *objectivism*. Current neo-realism in its American form is an objectivist theory.¹

The initial error, the starting-point of the whole false development, is phenomenalism, the identification of the immediate object of knowledge with the sense-datum. Once commit this error, and the other

¹ I have spoken of the sense-datum as a picture for the sake of vividness, but really it is not a picture but a predicate. A picture is of course an object distinct from the person or thing pictured. The sense-datum is not such an object, but the form in which the percipient pictures to himself the real thing. It becomes a picture in the ordinary sense only when, in reflection, it is distinguished from the real thing and itself made an object. The only object of perception is the real thing.

fallacies (except the fifth) follow by the strictest of logic ; so that, the better thinker a man is, the more hopelessly he goes wrong. The phenomenalist fallacy has become so deeply ingrained, as the result of three centuries of modern philosophy—through the teachings of great thinkers such as Berkeley, Hume, Kant, and the post-Kantians—that it is almost universally prevalent in contemporary thought ; and to denounce it is to fight an uphill battle, with little chance of carrying conviction. But perhaps physiological psychology will work the miracle.

Philosophers who make this identification must pardon me for exposing its fallaciousness, since no explanation of the origin of the mind is possible on such a basis. May I say a word about my own previous books ? I should be lacking in candour if I did not confess that they contain some of the fallacies which I here reprehend. In *Why the Mind has a Body* (1903), I was a subjective idealist as regards knowledge of the physical and a representationist as regards knowledge of the real. The nature of the real I thought of as “consciousness”—not yet distinguishing from each other feeling and awareness. By the time when my second book, *The Origin of Consciousness*, appeared (1918), I had outgrown subjective idealism, but I still remained a representationist. I had also come to see that awareness is a function exercised by the subject, and that the nature to be ascribed to the real is the nature of this subject. Representationism still clung to me up to the time of writing these essays, and only gradually disclosed

itself for the fallacy that it is in the course of their composition. Having thus frankly confessed my past logical sins, I trust that the reader will grant me absolution for them, and, if he is a phenomenalist, hasten to follow in my footsteps.

If phenomenalism is an error, its opposite, the recognition of a real thing distinct from the sense-datum but apprehended in that form, is the truth. This is what has always been meant in philosophy by *substance*; and the best name for the anti-phenomenalistic view is (not realism, which is ambiguous, but) *substantialism*. The contemporary repugnance to substance is due to the fact that we have but just emerged from a period of idealism, empirical and transcendental. Any philosophy which regards the real as consisting of sense-data is empiricist. Any philosophy which interprets real things as mere mental constructs made on the basis of sense-data, but without external existence, is transcendentalist; in truth the transcendental would not deserve its name if it were not a means of transcending. The latter of these philosophies is avowedly idealistic; but the former is in reality not less so, as may be seen from the fact that, when thoroughgoing, it regards the immediate object of knowledge and the subject to whom it is known as the same entity. It is natural that, when philosophers bred in idealistic habits of thought awakened to the necessity of a world of real things, they should at first compose these of ideas. For sense-data are ideas, which cease except as eventual data when we cease to intuit them.

The great objection always urged against substantialism is the supposed unknowableness of things in themselves. But this objection is wholly due to conceiving that the thing immediately known is the sense-datum. If what is known is the real thing, and the sense-datum is only a predicate by the ascription of which the character of the real thing is known, the objection disappears. The distinction of phenomena and things in themselves is not a distinction between things which appear, namely sense-data, and other things which do not appear: it is a distinction between things *as* they appear and things *as* they really are, and by the sifting of sense-data may be known to be.

If it is an uphill task to convince philosophers of the reality of substance, what is to be said of the enterprise of proving to them that feelings are not necessarily as they appear to be? This is a labour truly Herculean. He who essays it has need indeed of the physical method.

We do not feel pain unless there is something wrong in the body. It is perhaps not extravagant to suggest that, in feeling the pain, we really are cognising this bodily hurt. The problem is complicated by the fact that we do not certainly know whether the sensory nerve-process is limited to the hemispheres, or includes the peripheral part. Let us, for argument's sake, assume the latter to be the case. We never feel a pain without turning our attention in some degree to the bodily part concerned and becoming aware of

something there. But this something, you will say, is only a physical process.

What do you mean by a "physical process"—how do you conceive its nature? You imagine it indeed in terms of sense-data, and these may correctly render its special character, its spatial extent, and temporal rhythm: but it cannot itself be a sense-datum. Are you satisfied to think of it as "something I know not what"? Why may not its nature be truly presented by that peculiar sort of *being*, at once sensible and impulsive, which the pain is found to have when it is contemplated?

Emotions are less imperious than pains, but they too are dimly felt to be located in the body. So also are pleasures, displeasures, and desires. Ordinarily we feel these with reference to something on which our attention is mainly fixed; but in so far as we are aware of them at all, attention is turned also to the body. The peculiar sort of being they possess may therefore be the real nature of the bodily process. If, on the other hand, we assume that the bodily correlate of feelings is limited to the brain, introspective awareness of them will be attention to this bodily part, and the nature in question may be the real nature of the cerebral process.

So long as we conceive physical processes in the common-sense way and neglect to define their nature, the world appears to contain two totally different kinds of things, the relation of which is inexplicable. But by conceiving introspective awareness as cognition of the real, and allowing a measure of truth

to the cognition, we reach a conception of Nature which makes the self a part of it, and enables us to understand how a self can arise naturally.

If introspection is cognition, it is presumably brought about in a way analogous to the mechanism of perception, that is, by an image or a later phase of feeling exciting a reaction that makes us have to do with an earlier phase ; and in this situation a distinction between the feeling as it appears and the feeling as it is in itself is inevitable.

A last application of the physical method may now be made. If nervous processes, as neurologists and physicists tell us, are exceedingly complex, the feelings that appear to our senses as nervous processes and to introspection as relatively simple qualified states may, in themselves considered, be equally complex. They will have the nature which feelings are found to have when introspected—that nature which all feelings have in common ; but the special qualities that differentiate them from one another may be due to the vagueness and inadequacy of introspection, and be apparent but not real. How far feelings really are as they appear to be is a question for the criticism of cognition.

The principles on which this attempt at an evolutionary psychology is based have now been fully explained.

What name shall we give to that fundamental nature which not only feelings but all parts of the real have in common ? Shall we, with Bergson, call it “ life ” ? Or, with Bertrand Russell, speak of it as

“something midway between mind and matter” ? . Persuaded as I am that the fundamental nature of all things is the nature of the self, and setting out to explain how consciousness can arise, I prefer to call it *sentience*. Many explanations will be needed to make clear the precise sense in which this term is used.

“ ‘ A motion became a feeling, ’ ” says William James : “ no phrase that our lips can frame is so devoid of apprehensible meaning.” But if a motion, in itself considered, *is* a feeling ?

I

THE GENESIS OF SENSE-DATA : DISTANCE AND MAGNITUDE

My purpose in the first two of these essays is to set forth an hypothesis as to the manner in which data of intuition, or sense-data, come into being. Intuition is only one element in sensible acquaintance with things, the other element being intent ; the qualities and shapes that intuition reveals are predicates, which intent refers to a real thing as subject. The perceptive act, by which a real thing appears to the senses and there is awareness of it, always consists of intuition and intent together. What appears is thus not a mere quality or shape, but a qualified and shaped object, seen or heard or felt at a certain time and in a certain place, and presumed to exist.

This division of the character of the object from its existence, and assignment of the knowing of them to separate functions, might seem to involve the fallacy of representationism. I wish, therefore, to declare at the outset that, in my view, even when the real thing appears falsely, as it often does, it is still the real thing, and not any "appearance" or immediate object distinct from the real thing, that

appears. By its function of intent the mind succeeds in penetrating to the external existent and knowing it directly ; and when or in so far as the sense-datum renders this existent truly, the mind knows the thing as it really is. But since non-existent things and characters of things also sometimes appear, the mere fact of a thing appearing cannot be taken as a guarantee of its existence, or the fact of its appearing so and so as a guarantee that it really is so and so.

Thus we need an hypothesis which shall explain how what appears can be sometimes real and sometimes unreal. What is this function of appearing or awareness, which may uncover the existent and give us virtual intuition of it, or may hold up before us a mere show ? And first, how are sense-data produced ?

The hypothesis I shall suggest is that sense-data are *phantasms*, which may or may not correctly render fact ; and that these phantasms are produced by the co-operation of two factors, sentience and action. Action, or the way we behave upon occasion of a state of sentience—which state really is *in us*, that is, in the place where the correlated nervous process goes on—causes the state, or, more exactly, a phantasm generated by the state, to appear outside us, at a greater or less distance and more or less enlarged, and also very much simplified as compared with the state ; fictitiously altering the state and transforming it into a phantasm by means of two changes which may be called *simplification* and *projection*. In this manner sensible pictures of things are produced which, so far as they differ from the

sensations out of which they are made, are illusions. All sense-data, even truthful ones, are psychologically of the nature of illusions. When we cease to intuit them, they cease to be. Berkeley was right that their *esse* is *percipi* (in a sense of *percipi* in which it means, be intuited).

The resulting theory of perception will be seen to lie nearer to critical realism than to neo-realism. With the latter, we admit that the apparent thing and the real thing coincide when or in so far as cognition is truthful ; and are thus able to maintain that things are really in space and time, as they appear to be. But, with critical realism, we must insist that sensible acquaintance with things may be, and, in fact, always is, more or less untruthful, and that the apparent, therefore, is to that extent *not* identical with the real. Sensible knowing, in a word, is *precarious* ; and this hypothesis as to the mode of production of sense-data is adapted to explain its precariousness.¹

I

The Chief Conceptions Employed

The hypothesis here proposed is in most respects not new. The only feature of it which can lay claim

¹ The theory of cognition advocated in these essays was expounded, but in a form which I now regard as imperfect, in my previous books, *The Origin of Consciousness* (1918) and *A Theory of Knowledge* (1923). I should be obliged to critics if they would regard only the present form of it as representing my final views. A very lucid presentation of the same theory will be found in Prof. Drake's volume, *Mind and its Place in Nature* (1925), in the production of which I collaborated. On the partial coincidence of the apparent with the real, see Prof. Montague's *The Ways of Knowing* (1925).

to novelty is the rôle ascribed to action or behaviour in equipping the sense-datum with certain of its characters, and indeed in causing a sense-datum to arise at all.

1. *Projection*.—It is an old doctrine of the physiologists that sense-data are brought before us by the “projection” of states of mind called “sensations”.¹ To many philosophers this view has seemed to rest on a crude psychology; they have been disposed to question the existence of sensations, in the sense here implied—without which there would be no material for projection and no room for the process. Yet as great a philosopher as Kant held that sensible phenomena are manufactured by the mind out of the raw material of sense. A necessary part of our task will thus be proof of the existence of projectable sensations.

2. *Simplification*.—One of the original ideas which we owe to Bergson is that the specious present (the sense-datum in its temporal aspect) is produced by “contraction”,² or, as Balfour calls it, “compression”³—a process by which the innumerable temporal parts of the most recent interval of time are suppressed,

¹ Prof. Sherrington, either adopting the current phenomenalist view of sensations, or with the aim of restricting his statements to what can be empirically observed, prefers to speak of “projicience”. Dr. Head does not hesitate to say “projection” (symposium on “Time, Space, and Material”, *Proc. Arist. Soc.*, supplementary vol. ii, pp. 79, 83). Cf. Dr. C. S. Myers: “I believe that this power of projection, the ability of the self to regard its own change of states as something outside itself, is of far greater importance than is generally supposed” (address on “Consciousness”, *Lancet* for 29th Nov. 1924, p. 1109).

² *Matière et Mémoire*, pp. 30, 64.

³ *Theism and Thought*, p. 166.

and this interval is made to appear as one and undivided. By this process also sensible qualities are generated. Holt has argued that the simplicity of sensible qualities is in a certain sense illusory, and due to the suppression of a multitude of minute parts—to “condensation” or “fusion”.¹ Contraction and fusion are clearly the same process ; perhaps the most generally applicable and readily intelligible name for it will be *simplification*. But what is the status of the elements to which this process is applied ? And what is the nature of the process by which they are simplified away ?

Here again, as in the case of projection, the elements, which are sensations in the self either succeeding one another in time or next to one another in space, are not things of the same category as the resulting product, the sense-datum. The sensations are real, the sense-datum is a mere phantasm. The nature of simplification will be dealt with in detail in the second essay.

3. *Action*.—Our hypothesis is that simplification and projection are the work of action.

That action is concerned in the genesis of awareness has long been recognised implicitly. Dewey insisted many years ago that consciousness is correlated, not with sensory stimulations alone, but with a process in the entire sensori-motor arc.² Münsterberg and Baldwin explained the unity of consciousness by the synthesis of sensory currents necessary to their pro-

¹ *The New Realism*, pp. 308-354.

² *Psychological Review*, 1896, pp. 357-370.

ducing a movement.¹ Many neo-realists reduce awareness to mere action on the part of the organism ; but they do not make it clear how action can cause us to be aware. Bergson holds that our everyday vision of the world is determined by utility, *i.e.* by the needs of action ; but does not, I think, explain how action can have this effect.

According to our hypothesis, action causes sense-data to arise by simplifying and projecting states of sentience. That is, these states, which really are in the self, cause something to appear outside the self because they move us to react as if there were something there ; they cause this something to appear as qualitatively simple because we are unable to react as if it were other than simple. We have not the pre-formed tendencies to action that would permit us to be moved to response by the finer parts of which these states are in reality composed ; and we *have* such tendencies which oblige us to respond as if, *e.g.*, visual sensations were outside us. Thus the externality and the simplicity are data of action rather than data of sense.

If this hypothesis is correct, the characters which simplification produces by omission, and projection by imputation or addition, are artefacts—they are, as we may say, factitious. This implies that in a certain sense they are fictitious. They are so, however, only psychologically ; in that there is no character

¹ *Grundzüge der Psychologie*, pp. 529, 548. Cf. James's article on "The Knowing of Things Together", *Psychological Review*, 1895, p. 118; reprinted in his *Collected Essays and Reviews*, p. 390.

corresponding to them in the state of sentience. Epistemologically, of course, they are not (or need not be) fictitious, since sense-data are the sole means by which we apprehend the real.

Externality, the enlargement of visual sense-data in proportion to distance, simplicity as to spatial and temporal parts, and even objectivity itself, will be found to be factitious and fictitious in this sense.

4. *Sentience*.—Though the sense-datum is partly factitious, it is not wholly so, since it derives some of its characters from the state of sentience. Indeed, no sense-datum would be intuited, and there would be no awareness, if there were not a state of sentience to project and simplify. To this state the sense-datum owes its being and its sensible nature. Hence it might seem that, by eliminating or abstracting from the factitious characters, we may arrive at the element of “bare sense”, the sensation, and so assure ourselves of the existence of what I call *sentience*.

This, however, is an error, a false scent. Projection is not the actual conveyance of the sensations to a place outside; it is the conjuring up of a vision of something there—a phantasm. Only if it were the former would the sensations be contained in the sense-datum and discoverable in it by analysis. It would evidently be futile to look for sensations in a phantasm which shows only the apparent characters of external things. Thus, though sense-data are made out of sensations, we cannot obtain knowledge of the sensations by considering the sense-data—knowledge of the subject by considering objects. If we are ever to learn

that there is a percipient self, this knowledge must come to us in some other way than by analysis of the perceived.

And yet, whenever we perceive, the sensations that yield the sense-data used as predicates are always present in us. The relation between the two is like that between a painting and the scene it depicts. We can never discover the pigments, the minute dabs of paint arranged in such a complicated way, so long as we are absorbed in looking at the scene. A change in the direction of our attention is necessary for that.

The nature of introspection is a difficult subject, which can be better discussed when we have proceeded a little farther in our analysis of sense-perception. I must ask the reader for a few moments to take the existence of sentience for granted.

If sense-data are factitious, and come before the mind only when sentience prompts us to action addressed to objects, there will be no subject-object relation in mere sentience—it will not, considered in itself, be awareness of anything. It will be characterised by that absence of inner duplicity which James ascribes to “pure experience”. Bradley, I think, is tending towards the conception of sentience when he speaks of “sensuous experience” or “immediate experience”.¹

¹ Readers who entertain doubts as to the existence of sentience will derive help from reading Bradley's discussion in *Essays on Truth and Reality*, in the chapter “On Our Knowledge of Immediate Experience”. His term “immediate experience”, however, is open to objection, as more likely to suggest the contrast of actual with inferred objects

For our present purpose it is necessary to give precision to this conception in two further respects, which represent departures from the views of either of the philosophers mentioned.

5. *Spatiality of Sentience*.—If we are to understand how, out of sentience, action can generate sense-data such as the actual ones—and also to understand the relation of sentience to the process in the nervous system—we must assume that sentience is spread out in the three dimensions of space, continuous in time, and composed of an indefinite number of small parts. It will then be possible to explain the absence of the smaller of these parts from the sense-datum (of spatial and temporal parts in the case of qualities, of temporal parts in that of the specious present) by the simplifying effect of action—or rather of inaction, of our inability to react.

6. *Realism in Perception*.—If sentience is in space, and the portion of it used in seeing or touching is inside the body—as the intrinsic nature of the nervous process—there is no reason why there should not be (and every reason why there should be) a thing, than the contrast of sense-data with sentience. Bradley himself is perhaps not entirely clear as to the distinctness of these contrasts.

James's expression "pure experience" might indeed be applied to sentience—if, that is, by "experience" we mean not experience as a knowing but experience as a living; but for him, as a neo-realist, of course it means the mere being of phenomena. Blinded by his rejection of "consciousness" as an existent, he did not realise what a paradox it is to say that the immediately perceived is also the subject who perceives. As the only quite unambiguous term I have chosen "sentience", which, coming as it does from *sentire*, may be reasonably held to signify feeling without awareness. The *Concise Oxford Dictionary*, it is true, defines *sentient* as "having the power of sense-perception": but sensations, when they prompt to action, do give us that power.

consisting of sentience or of something equally real, at the point in space to which the visual or tactile sentience is fictively referred. Thus our hypothesis leads to a thoroughgoing realism—a realism which regards subject and object as separate existents. They are two co-equal portions of sentience or of something equally real, in the one world of space and time.

If this account of the nature of external things is not to appear fantastic, I must show that both they and sentience are knowable, and that to suppose them to consist of sentience is to give a reasonable account of their nature. The argument will be, that external things are known only through phantasms, and must be of such a nature as to be capable of producing these phantasms.

7. *External Things Knowable*.—When a portion of sentience, consisting of a multitude of fine parts in a complex spatio-temporal arrangement, prompts to an act, it is simplified and projected, and gives rise to a sense-datum whose characters may coincide (but never do coincide more than partially) with those of the external thing. Such coincidence is possible, because the sense-datum is a mere phantasm. If and so far as there is coincidence, the external thing has become an object of awareness. The illusion which caused something sensible to appear as outside the body has brought to light a thing really existing there. An illumination from the body has fallen on this thing, showing it in some respects as it really is. Originally all sense-data are taken to be truth-telling :

but we gradually, by the method of coherence, sift out and reject the erroneous elements—thus constructing first the world of common sense and then that of physical science.

8. *Realism in Introspection*.—It would be a very short-sighted view which should limit our acquaintance with ourselves to perceptive knowledge of our bodies, or to this together with what are called internal sensations. On the contrary, when we see, we are often *aware of our seeing*; when we hear, *aware of our hearing*. This awareness of our seeing and hearing has commonly been supposed to be an awareness of *awareness*. But the difficulty of being immediately aware of our awareness is comparable to the difficulty of grasping, not an object, or the other hand, but the act of grasping itself. In truth, what we are aware of, when we are aware of seeing, is not the *act* of seeing, but the visual sentience which is the subject (or the relevant part of the subject) of this act.

That we can become aware of the states of sentience which constitute our own being is clear from many common experiences. For instance, when we find a light trying to the eyes, or a sound unpleasantly loud, our attention is not occupied exclusively with the external cause, but quite as much with the intolerable state of sentience which this cause has produced in us. We are aware of our visual or auditory sensations as unpleasant. In listening to sweet music we have the opposite experience: we are aware of a sequence of states of sentience which is pleasant. In fact, in

aesthetic enjoyment what enthralls us is the character of our states of sentience—quite literally, we enjoy *ourselves*.

Thus, closely connected with the sense-data that reveal external things, other data are possible that reveal the sensations by means of which we perceive the things. Only a slight shift of our attention is necessary to bring the latter as objects before the mind. No one doubts that introspection reveals pain, pleasure, and emotion, or that these are non-physical in their nature ; but it will not be so easily admitted that it reveals also sensations which are distinct from sense-data and not to be obtained by analysis of them. The only “sensations” ordinarily recognised are qualities given to awareness. But it is not these objective qualities that make intense light and sound unbearable. It is the visual or auditory states which the light or sound has produced in us, and which, by simplification and projection, yield the intense sense-data. Sensations in this sense, then, and the feelings that resemble them, are the objects of which introspection makes us aware.

9. *States of Sentience Knowable*.—Sensations may exist in us without being introspected, as they do when we use them for perceiving external things. When the sensations themselves become objects of awareness, they are not referred to a place outside us, as in perception, but to the place where the correlated nervous process occurs. The shift of attention required for introspecting them involves a reaction addressed, more or less vaguely, to this place. That which

prompts this reaction is an image or a later phase of the sensation introspected. The mechanism of introspection is thus exactly analogous to the mechanism of perception: in both cases the object known and the state by means of which it is known are distinct existents, and in both cases the knowing involves a reaction prompted by the state and addressed to the thing known.

Under these circumstances projection and simplification will occur in introspection as much as in perception, and there will be an introspective datum, analogous to the sense-datum, which must be distinguished from the state of sentience introspected. There will be projection, or rather introjection, because the reaction refers the state to a place within us. There will be simplification, because we are unable to be stirred to reaction by the finer parts of which the knowing state is composed. Thus there is room for a distinction analogous to that in perception, between a state of sentience as it appears to introspection and the state as it really is.

That states of sentience as they really are may differ markedly from states of sentience as they appear, is shown by the fact that these same states appear to the senses in the form of exceedingly complex nervous processes. We thus have two modes of access to them, two divergent accounts of what they are, and must conceive them in such wise as to reconcile with each other these two unlike visions of them. We might indeed be tempted to discredit one or the other of the visions, and to treat the object at once

perceived and introspected as either predominantly physical or predominantly psychical : but there is no reason why we should not retain our natural confidence in the truthfulness of awareness so far as the visions do not contradict each other ; and if we do so, we shall conceive the state of sentience as having the peculiar nature shown by introspection, but as being in space as well as in time, composed of innumerable parts, and causally efficacious, like all objects of perception. In this way we shall reach the conception of sentience necessary for explaining the origin of consciousness.

The procedure of evolutionary psychology, in short, in passing from data of introspection to fine parts of sentience will be exactly analogous to the procedure of physics in reasoning from everyday physical phenomena to atoms.

The chief conceptions I propose to employ in accounting for sense-data have now been made clear, and we may proceed to apply them to the special case of the visual perception of distance and magnitude. How can sensations which really are within our bodies give rise to sense-data showing objects as at a distance from us ? How can the sense-data show us objects so large, as compared with the eye that sees them or with the nervous process with which the sensations are correlated ? If, by assuming atomic states of sentience, we can explain these features of the sense-datum ; if, still more, we can account for the fact that with a reversed retinal image (and presumably also central nervous process) we perceive

the object erect and unreversed, that will be a strong argument in favour of our hypothesis of sentience and of the origin of sense-data from sentience by projection.¹

II

Distance or Depth

IN analysing vision, the first thing that strikes one is that depth is given, so to speak, *in different terms* from length and breadth: length and breadth are coloured, while depth is not. If we take a coloured plane, such as the cover of a book, and rotate it about one edge in a direction away from the eye, the colour shrinks and disappears in exact proportion as the depth increases. Depth, or distance, is a sort of blank. We cannot say that it is invisible, because we *see* it; but, at least, it is transparent—we see objects beyond or “at” it, and it opposes no obstacle to our seeing them. How is this strange nature of distance to be explained?

¹ These characters of the sense-datum have been discussed with much acumen by Mr. H. N. Randle in his article, “Sense-Data and Sensible Appearances in Size-Distance Perception”, in *Mind* for July 1922. He mentions a remarkable experiment—that of looking at a printed page while fixating a pen-point held midway between the page and the eye, when the print undergoes an extraordinary diminution of size—and seeks to prove by it the non-existence of sensations distinct from sense-data. I can accept this conclusion only in so far as it means that there are no sensations which are obtainable by analysis of sense-data (just as atoms in physics cannot be obtained by analysis of everyday physical phenomena). But if, not content with merely registering the connexion between fixation of the pen-point and diminution in the size of the print, we desire to explain it, I think this will be found to be possible only by the hypothesis of minute parts of sentience which (like atoms) are not actually observable. Cf. my discussion in *Mind* for October 1929, pp. 462-465.

Since distance seems to be actually felt,¹ and yet is without definite quality, it is natural to think first of muscular sensations as the feelings conveying it. The eye-muscles play an important part in vision ; they are in a different state of contraction according to the distance of the object ; this state calls forth muscular sensations : perhaps, then, it is these that give us our sense of depth. But how ? The exact *modus in quo* is far from clear. Why should muscular sensations, when added to visual sensations, cause the latter to appear to be outside us ? And is it the muscular sensations themselves, appearing outside, that give us that sense of an intervening space ?

Muscular sensations are simply feelings in the muscles. As such, they can only be *signs* of distance—like the dimness or the smallness of objects—not in themselves a vision of it. How, then, do they succeed in bringing this vision before us ? There seems no more reason why they should cause something to appear as in space outside us than why the colour sensations should do so. In adding them to the colour sensations we have only repeated the problem without solving it.

The perception of depth is to some degree at least a product of experience ; persons born blind and subsequently operated on do not perceive it as we do. It is natural, therefore, to think next of the possibility that it is brought before us by means of mental images.

¹ Cf. James, *Principles of Psychology*, vol. ii, p. 221 note : "The feeling of depth, of distance, of farness or awayness, does actually exist as a fact of our visual sensibility."

These can hardly be visual images of lengths and breadths; no such images are introspectively discoverable. According to Berkeley's theory of vision, distance is perceived by means of images of touch and movement: we imagine the movements we should have to make in order to reach and touch the distant object. But these images, too, are not in fact introspectively discoverable. Nor do they seem to be identical with that character of visual sense-data which we call depth. Depth seems to be more specifically visual than this. How can tactile and muscular images, any more than muscular sensations, produce that visible gap between us and the colour, that blank, which is necessary in order that the colour should appear as at a distance?

Since depth is a blank, an entirely different element in the situation, a motor as opposed to a sensory element (though I shall argue that this motor element is itself accompanied by feeling), seems better fitted to explain it—namely, *action*. The view here proposed is that *the colour appears to us as distant because we react as to something distant*.

The sense-datum, as we have seen, depends on a process in the entire sensori-motor arc, a process having a motor as well as a sensory part. Is the motor part of this process accompanied by sentience? This is a question which seems to have been decided by psychologists in the negative;¹ though our hypothesis that all physical events are intrinsically of the nature of sentience would involve the contrary view. In any

¹ But see Münsterberg, *Grundzüge der Psychologie*, pp. 529-530.

case, the contraction of the muscles is reported to the self by kinaesthetic sensations, and either the hypothetical motor sentience with kinaesthetic sensations, or these sensations alone, fused with the colour sensations, would furnish an explanation of the fact that depth is actually felt. Thus in any case we have colour sensations calling forth a felt reaction, which is a reaction to the object as at a certain distance. In order to have the sensation at all, we must converge and accommodate the eyes, and this is a first phase of the reaction ; this phase *implies* distance, being an adjustment of the organism to it ; and it prepares the organism for ensuing reactions to the object as at that distance, which is a second phase. *E.g.*, if we have converged and accommodated for an object at a distance of ten feet, we are in a state of readiness for advancing toward it, touching it, or otherwise behaving with respect to it.

Our theory, then, is that this reaction and readiness for reaction, this adjustment to the external, with the motor and muscular feelings that accompany it, imparts to the colour the character of being at a distance, and so gives rise to the actual visual sense-datum. All these states of sentience, in themselves considered, are intra-bodily, and produce the sense of externality only in virtue of the significance which action attaches to them. The principle is, that if we are in the habit of behaving as if the visual sensation were in a certain place ; if, still more, we are organised from the beginning so as to respond automatically in this way, it will inevitably appear to us to be there ; even though,

in reality, it is in quite a different place. A sense-datum characterised by externality will be generated. Thus, despite appearances to the contrary, visual sensations may really be all in one plane (or even in a concave surface like the retina or the occipital cortex), and action will project them outward to different distances, according to the place with reference to which we react; and the visual sense-datum will be, for instance, that of a crowded street, with people, carriages, and buildings all in different planes.

When we wear blue glasses and everything looks blue, or when after gazing at the sun we see an after-image of it on surrounding objects, conditions either close to or inside the organism have led to a sense-datum characterised by distance. These are undeniable instances of projection. May not the distance of the blue objects or of the after-image be due to our automatic tendency to behave as if we had to do with things at a distance? May not *all* vision of objects as distant, therefore, be due to action? Sounds, again, are heard as external—the bell of a church as distant, a friend's voice as near. The sensation itself vibrates within us. May not the externality of the sense-datum be due to our tendency to react as if the cause of the sensation were in a certain place? If we remember that the reaction, in all these cases, is felt, we shall understand why distance appears to be sensible. In truth it is not a datum of mere sense, but a meaning which intent (the implicate of action) attaches to sense.

To sum up: as the vehicle of the perception of length and breadth is the actual extension of the visual

sentence in length and breadth (its depth being lost by simplification), so the vehicle of the perception of depth is the connected tendency to action, with the motor and muscular sentence that accompanies this tendency. We are apt to ignore the part played by action and feelings of action in this matter, because depth seems to be actually *seen*. But our theory explains why it is seen as a "blank" and why it is so closely attached to colour.

Assuming, if only for argument's sake, the correctness of this theory, let us now consider certain consequences that follow from it. If this is the means by which colour is made to appear as distant, depth is psychologically fictitious. But the fiction is one designed in the providence of Nature to acquaint us with external fact. This was the device hit upon by natural selection for making distant and, therefore, materially absent things present to our minds. In very early times it was of advantage to animals to act as if certain of their sensations were outside their bodies, because by so acting they adjusted themselves to a thing which was really present there. Thus consciousness was evolved because of its utility. But it would not have been useful if there had not been really a thing at that point: psychological fiction therefore implies epistemological realism as its necessary counterpart.

Our theory receives confirmation when we pass from the perception of distance to that of magnitude. Objects appear smaller in proportion to their distance from us; yet an object near at hand, such as a house,

may appear many times the size of the body, and therefore many times the size of the sensations by means of which it is seen. That this enlarged magnitude as compared with the sensations is not a datum of mere sense, but is factitious and psychologically illusory, is shown by the fact that a smaller near object may exactly cover and conceal a larger distant object—*e.g.* a book held in the hand cover and conceal a door ; and that a larger object, such as a mountain or a landscape, may be framed in by a smaller object, such as a window. The tendency to react as to a larger object, when the object is at a distance, would explain this illusory increase of size ; and since kinaesthetic sensations and perhaps motor sentience make us feel this tendency to react, they would explain the fact that the enlarged magnitude is actually felt.

When we realise that distance and enlarged magnitude are data of action, the temptation at first is to imagine that by suppressing the reaction, or even by merely abstracting from its effect, we can recover the visual sensation in its purity and have it present with its true characters as a datum before the mind. In this way we fall into a fallacy, which is that of supposing the sense-datum to contain the sensations. We must be quite clear of this fallacy if our hypothesis of projection is to rest on a sound basis ; and I shall therefore devote a few words to exposing it.

Let us consider first what would be the effect of suppressing the reaction. We should no longer get the same sensation ; for, in order to have the sensation necessary for seeing an object at a distance of ten feet,

we must converge and accommodate the eyes for that distance. Hence it can, at most, be by abstracting from distance and magnitude that the sensation is obtained. But abstraction from distance and magnitude still leaves the sensible qualities, which according to our hypothesis are products of simplification; it has removed the externality and the enlarged size which are due to projection, but it cannot undo the work of simplification.

And yet, by this abstraction, we have taken a first step toward that other kind of cognition which is introspection. If, besides abstracting, we react, now that the datum is without distance and magnitude, in a new way—namely, as if we had to do with something inside our bodies—the object then present to intent will be the sensation, and what is intuited will be the introspective datum, that is, the form in which the sensation appears to us.

Thus, though data of introspection are distinct from sense-data and different from them in what they show, they are always immediately obtainable when we intuit sense-data, and may give much true information about the sensations out of which the sense-data are formed. The phenomena of covering and framing are an example of such information. When, abstracting from distance and magnitude, I hold up a book and notice that it exactly covers and hides a door, I am observing the spatial equality of the two visual sensations. When I notice that the landscape is framed in by the window, and the window in turn by the rim of my glasses, I am observing that the

window-sensation is larger than the landscape-sensation and that the rim-sensation is larger than either. James's well-known example of the after-image projected on different backgrounds, and appearing "as big as a strawberry, as large as a plate, bigger than a house," is another case in point: despite the different magnitudes that go with different distances (and from which we abstract), a single sensation of unaltered size has been present in the self throughout.¹

But, though introspective observation has the sensations themselves for its objects and shows them in some respects as they really are, it would be erroneous to conclude that they have not other characters which are not actually observable, and still more erroneous to suppose that the introspective datum is itself the sensation. Introspective data, like sense-data in perception, are only predicates, which may or may not truly render the state of sentience of which they are asserted. For introspection, as much as sense-perception, involves intent—as may be seen from the fact that it refers the state to a place inside the body—and it is intent, penetrating to the state itself, which asserts the introspective datum of it. The state, then, as it really is, may have more characters than introspection is able to reveal; characters which come to light when the state appears to the senses in the form of the nervous process.

¹ The general principle is that the enlargement is greater in proportion to the distance for which we converge and accommodate. This would explain the marked diminution in the size of the print in Mr. Randle's experiment (referred to in a previous note), if we could be sure that the change of fixation has not altered the size of the retinal image. I must leave decision of this point to specialists in physiological optics.

III

Necessity of a Subject

In the effort to be strictly empirical, psychology has tended to be phenomenalist, putting sense-data and data of introspection on the same plane ; though its duty was to conceive its objects in such a way as to explain their peculiar relations—the relations by which visual sense-data cover and frame in each other, their visibility only from the point of view of the body, and the dependence of all data on the nervous process. There is an even more fundamental fact, of which a psychology that recognises only data can give no satisfactory account, and which requires for its explanation the hypothesis of real states of sentience. This is the fact that all data are given *to some one*—that *I* am aware.

This *some one*, the *I*, is in outward appearance the organism. Now there are two alternatives between which a psychology that recognises only data must choose. It may say that the organism consists of sense-data—of other sense-data, of course, than the one at any moment given—or that it consists of the physical processes revealed by sense-data. What, on each of these views, is the conception of the knowing subject and of the act of awareness which results ?

The former view is obliged to regard awareness either as inherent in the sense-datum, or as a relation between the actual sense-datum and the possible sense-data composing the organism. In either form this view has the most untoward consequences. If

awareness is an intrinsic character of sense-data, and sense-data are the stuff of which real things are made, these things must continue to have awareness in them even when we are not aware of them—they must still appear, when they do not appear *to us*. The result is that no explanation can be given of the change that happens, the new relation that arises, when, from merely existing, they become existent *for us*. Evidently appearing or awareness is a term meant to designate this new relation.¹ If, on the other hand, awareness be conceived as a relation between the actual sense-datum and the complex of possible sense-data forming the organism, it is impossible to understand how one sense-datum or complex of sense-data can intuit another.

The second view regards the organism and things outside it as consisting of the physical processes revealed by sense-data, and these processes as purely physical in their nature. The relation then looked upon as constituting awareness will be the causal relation by which the organism adjusts itself to the external thing—the same relation of which our own theory makes use for this purpose. But since the organism is conceived as purely physical in its nature, this relation cannot serve the purpose. A causal relation between physical existents is not the same thing as awareness. The organism does not merely

¹ If, with Bergson, you put the perception “in the object”, you cannot get it out of the object so that the latter may exist unperceived. Mr. Russell seems to me to be committing the opposite error when he says that sense-data, not sensations, are in the brain. Both these views are results of phenomenalism.

respond to things outside it: it *enjoys* them. This, in fact, is why the organism, or the centre of enjoyment in the organism, is called "I". Hence this view can only note the concomitance of awareness with a process in the nervous system, without explaining it.

To relieve somewhat the disparity between the physical nature of the organism and the spirituality of awareness, those who take this second view will perhaps say that physical processes are mysterious and unknowable in their nature. In this form the view not only leaves the relation between the organism and awareness unexplained, but declares it to be inexplicable; and it does not avail itself of the information as to the nature of the real furnished by introspection. The real is evidently of such a nature that, when arranged in the form of an organism, it can be aware; and introspection, when certain illusions as to its objects have been dispelled, reveals the nature which permits the organism to be aware—namely, sentience.

Phenomenalism in psychology was the result of rejection of a Soul—a being conceived as simple and indivisible. What is called the "unity of consciousness"—the fact that the objects of which we are at any moment aware form a single field and are given to a single act of awareness—is so impressive, that it is natural to infer that the subject of this act must have a like unity. Kant showed the fallacy of this argument; but his "I think," which may accompany all our thoughts, is only a recognition of the "I" so far as given to introspection, and, owing to his agnosticism,

ignores its reality and nature as an existent. Yet who can doubt that his self is a part of the real? And why should we suppose that introspection gives us no knowledge of our nature?

Neither of the views mentioned offers any explanation of the mode of genesis of sense-data. With introspective data alone, and without real states of sentience which they reveal, the task of psychology is reduced to correlating the various kinds of data with processes in the nervous system. Only by assuming states of sentience, with characters which may account for the nervous processes as well as for the introspective data, can psychology become explanatory.

IV

Atoms in Psychology

Since, on our hypothesis, sentience must be conceived to be as minutely subdivided as the nervous process which is its revelation to the eye, what we are here proposing is an atomic theory in psychology. Why must we assume states of sentience to consist of minute parts which are not actually observable—why not be content with the parts that are introspectively observable? The question is like asking, why not be content in physics with everyday phenomena—why assume atoms?

In justification of the analogy between minute parts of sentience and the atoms of physics, two sets of considerations may be adduced.

(1) Sense-data, while predicated cognitively of the

external thing, depend existentially on the subject or self, which appears as the organism. Hence, owing to their origin, they are adapted to throw light on the nature of the organism or self, and not merely on that of the external thing. As Spinoza says, *Ideae, quas corporum externorum habemus, magis nostri corporis constitutionem quam corporum externorum naturam indicant*. Sights and sounds, though partly expressive of external things and events, are not wholly so, but contain many elements which are referable not to the perceived object but to the body of the percipient. Thus there are after-images, contrast phenomena, illusory and hallucinatory data (and, as we shall see in the next essay, also secondary qualities), which cannot except by violence be fitted into the physical world; and which are denied a place in it by physics. Further, there are characters of the perceived which are intelligible only when we consider that sense-data have their source in the organism: such as the unreal smallness of distant objects, the perceptive distortion of lines and angles, covering and framing, and the fact that objects are always seen from the point of view of the organism. Finally, there is the fundamental fact that sense-data arise, cease, and vary in their characters with an intra-bodily process. In view of these various facts, how can it be denied that sense-data are adapted to throw light on the self, and that even a self composed of atomic sensations may be required to explain them?

(2) But the atoms of physics, it may be objected,

are possible data of experience—if not actually observable, they are at least potentially so : whereas these atoms of sentience are metaphysical entities, assumed to lie behind phenomena, and unobservable not only on account of their exceeding smallness but essentially. Let us see how much force there is in this objection.

The reply will be twofold. First, the atoms of physics are existent when what we observe is ordinary physical things—the things are in fact aggregates of atoms, though we cannot actually observe them to be such ; and in the same way, the states of sentience which we observe when we predicate introspective data of the self are in fact aggregates of atoms of sentience, and though we cannot observe these atoms individually, we can and do observe the aggregates of them. Thus the difficulty of actual observation is precisely the same in the latter case as in the former ; the analogy between the two kinds of atoms (which really are one kind) is complete.

Secondly, are the atoms of physics in truth potentially observable ? In thinking of electrons and protons, no doubt we imagine them as if they were possible data of experience, and perhaps see in our mind's eye minute dots circling on a lighter ground ; but we know very well that they cannot have colour (even black or grey), and are consequently not capable of being seen. For us to see them, they would have to be endowed with a colour which they do not in reality possess. Notwithstanding this, we consider

that they, and they alone, constitute the materially real—that a flower, or a book, consists of them (in a definite arrangement, of course) and of nothing else. They are not merely ulterior phenomena, non-existent at the moment when we see the book: on the contrary, they exist *now*, and are that which we see, though we do not see it with all the parts which it possesses in itself.

These two points—their colourlessness, and their present existence—suffice to prove the complete analogy between the atoms of physics and the atoms here contemplated for psychology. The reasons why we cannot actually observe the atoms of sentience are just the same as the reasons why we cannot actually observe physical atoms; first, because we are built on too large and coarse a scale, with organs unfitted to seize anything so minute; and second, because the atoms of sentience, taken one by one, have not the qualities which they cause us to experience when, by means of a great cloud of them, we see such an outer thing as a green leaf or feel such an inner state as pain or anger.

Why, if the atoms of physics are not actually observable, do physicists nevertheless assume them? Because, by assuming them, they are enabled to explain peculiar complicated data of perception which would otherwise be inexplicable. Atoms in psychology will be justified if they can render a similar service: if, by their help, we can explain the genesis of sense-data and account for their otherwise inexplicable characters.

Let us now see whether fine parts of sentience can give us any assistance in explaining the character of magnitude in the visual sense-datum, which permits us to see objects, such as a mountain or a landscape, that are so enormously large as compared with the eye. It is not necessary, for this purpose, to use bits of sentience as minute as atoms ; it will suffice if we conceive them as smaller than any parts which the eye discovers—say, as corresponding in their magnitude to individual nerve-impulses. Of course, in the world of sentience, there will be the same continuity which we observe between the parts of the nervous process.

V

Enlarged Magnitude

The field of vision, if we include in it that blank of distance, forms a sort of cone, with its point in the lens of the eye ; from which point a lesser cone, formed by the prolongation of the other, passes to the retina. This is only schematic, since light in fact comes in pencils ; but it is as if vision took place only along the central line of each pencil. From each spot in the retina such a line proceeds to a corresponding spot in the visual field ; and the interruption or inclusion of these lines is evidently the cause of the phenomena we have called covering and framing. These central lines cross one another in the nodal point of the lens, in such wise that the retinal image is inverted and converted—or, as we may simply say, *reversed*.

Now the visual sense-datum differs from the retinal

image, and presumably also from the consequent cerebral process (that in the visual area of the cortex, or wherever it may be), in three respects: as to (1) distance, (2) size, (3) reversal. The theory of projection by means of action seems at first sight to explain (1) but not (2) and (3). Distance may perhaps be illusory, and due to our habit of acting as if the sensation were at a distance; but why does the sense-datum have this enlarged size? Why, still more, do the parts of the sensation appear in it reversed? Evidently there are two further illusions here (if they are illusions), for which our hypothesis is bound to account. How, by means of a small, reversed sensation which is inside him, can the subject see an object not only outside him but unreversed and large? Why, moreover, if this reversal is due to a fictitious projection, are we unable to undo it and be introspectively aware of the true arrangement of the sensation's parts?

To these questions our atomic psychology permits us to give a clear and satisfactory answer. The answer, briefly stated, is that vision must not be conceived as a function performed by the mass of visual sentience acting as one whole, but by its parts in length and breadth each acting on its own account. Each bit of sentience, that is to say, incites on its own account to action, and to an action appropriate to itself individually. Thus it is as if each bit of sentience, the real being of a nerve-impulse hurrying toward the motor centres and seeking to determine their response, were a little eye, and as if the action to which it incites determined the value, *i.e.* the external position, of

what the little eye sees. Our total vision is the sum of the countless visions of these little eyes.

Any difficulties which this explanation might seem to involve will, I believe, vanish if *all* the following points are borne in mind.

(1) The action referred to as causing projection, and therewith enlargement and reversal, is not of the deliberate or intentional sort, the sort one can undertake or refrain from at will ; but is instinctive, automatic action—the sort one *must* perform in order to attend to and see a distant object at all.

(2) The self which performs this action is spread out in space and composed of an immense number of parts, and the total act is the sum or integration of the activities of these parts. Each bit of sentience has its own special motor action or tendency, and strives so far as in it lies to determine the total action of the organism in its own sense. For instance, each separate bit of colour sensation tries to bring about an eye-movement directing our glance to a corresponding external spot ; and a bit of colour, therefore, appears in the spot towards which our glance, if the act took place, would be directed. It is as if we had as many separate eyes as there are rods and cones, and as if each eye saw along its own visual line.

(3) These lines, as we saw, cross one another in the nodal point of the lens ; being identical with the lines which the central rays of the light-pencils have followed in coming from the parts of the object to the retina. It is not indifferent that projection should follow out these same lines in the reverse direction, since by that

means the spatial positions of the parts of the object are accurately seen : but it evidently involves the consequence that, as the crossing of the light-rays led to reversal of the retinal image and cerebral impression, so the projection of the bits of sentience along these lines in the opposite direction must lead to a reversal of that reversal, and therefore to the object being seen erect and in its true relations.

This, I venture to think, is the solution of the old puzzle about the reversal of the retinal image. It depends, as will be seen, on the three points of (a) projection, (b) crossing, (c) the composite self.

(4) In order, finally, to explain enlargement, *i.e.* the fact that the apparent magnitude of objects varies with their distance,¹ we need only remember in addition, first, that the bits of sentience employed in vision are extremely minute : so minute that if they were projected literally, like very fine bird-shot from a gun, a larger and larger surface, according to the distance, would be peppered over with light or colour ; secondly, that projection is not a literal, but only a metaphorical, intentional, and fictitious shooting-out, a bringing of figments before the mind and not an actual extrusion of feelings from the body. Do not covering and framing prove that this must be the true explanation of enlargement ?

When these four points have been adequately digested, it seems to me that all the difficulties in the notion of the origin of visual sense-data by projection from the brain vanish away, and our theory is seen

¹ And, perhaps, the small size of the print in Mr. Randle's experiment.

to afford a complete explanation of the facts. If it costs us an effort to believe that characters so unquestionably experienced and to the senses so real as distance and magnitude can be fictitious, we should remember that vision is a function that has existed since before there were vertebrates, and that an illusion so necessary to its success in conveying knowledge and guiding action must needs be very deeply ingrained. Are not Nature's ways in producing this function, if our account of them is correct, quite of a piece with the means by which, according to Darwin, she has brought about the origin of species? If, in the laudable effort to give us eyes, she has resorted to a little harmless deception, her lapse must, I think, be pronounced a *felix culpa*.

II

THE GENESIS OF SENSE-DATA : SENSIBLE QUALITIES

IN the preceding essay I set forth an hypothesis according to which sense-data are the joint product of two factors, sentience and action ; action—that is, motor response—elaborating them, by means of two changes called simplification and projection, out of states of the self which are of the nature of sentience. These states are the true and only “ sensations ” ; they form the inner being of nervous processes, and are complex and composed of a great number of parts, like these processes ; though revealed after a fashion in the sense-datum, they are not in their minuteness observable, but are reached by an hypothesis exactly analogous to the atomic theory in physics. And I showed how, by means of this hypothesis, we can explain the peculiarities of the visual perception of distance and magnitude, and even solve the old puzzle of the reversal of the retinal image.

The explanation, however, was incomplete, in that at several points the change called simplification had to be taken for granted, although its nature had not been made clear. How, by means of a complex spatio-temporal arrangement of bits of sentience, are we

able to see colours ? And why, if the arrangement is tridimensional, do the colours appear spread out in length and breadth only, with the result that depth has to be recovered by means of projection ? These are the questions which I shall try to answer in the present essay.

Simplification may be defined as the process by which a multitude of fine parts of sentience, either spatial parts or temporal parts or both, give rise to a datum which is destitute of parts, and therefore simple or "one". In so far as the parts are temporal merely, the datum to which they give rise is the specious present. If, in addition, the parts differ from one another in intensity and so have a temporal rhythm, and perhaps also a complex spatial arrangement, the datum produced by simplification is a sensible quality.

Bergson was, I think, the first to draw attention to this process and to give it a name. He calls it "contraction", a term specially appropriate to the case of the specious present, which does perhaps seem through the omission of parts to be shortened into a mere flash of occurrence, or moment. Sensible qualities, on the other hand—colours, for instance—do not occupy less extension than the parts of sentience which give rise to them, but only gain simplicity through the disappearance of the spatial or temporal arrangement which is their ground. For this reason I prefer to speak of the process as "simplification", a term which applies to all cases and is readily understood. The term ordinarily used by psychologists for this

process is "fusion", which it will also be convenient at times to employ; but, in employing it, we must bear carefully in mind that the product of fusion does not (as the word perhaps suggests) belong to the same category as the elements fused—the latter being sensations, while the former is a sense-datum. Still another term, which I shall sometimes use because it brings out an important aspect of the process, is "summation". In a sum the elements disappear; but they are lost only to view, and still have their effect in determining the total quantity.

The common characteristic of all cases of this process is that we are aware of a whole without being aware of its parts. This is a paradox, and the problem is to explain it. Bergson explains it by means of *memory*.¹ Balfour, who evidently feels a doubt, speaks of "something resembling memory".² I shall try to show that the agency concerned is not memory, but *action*. We are unaware of the parts because we do not react to them, or are unable to react to them.

Simplification, with its result, the intuition of a sensible quality or a temporal character, does not take place only in cases where the parts omitted are extremely small, but also in cases where they are large enough to be easily discoverable by subsequent analysis. We may consider first some of these everyday cases of summation into a vague whole. The way will thus be prepared for considering cases where the parts *cannot* be subsequently discovered—as in the case of sensible qualities and of the specious present.

¹ *Matière et Mémoire*, pp. 30, 64.

² *Theism and Thought*, p. 166.

I

Awareness of Vague Wholes

The field of view, at any moment, contains a vast number of objects and relations between objects to which we do not separately attend. Usually some one thing stands out prominently and attracts our notice, and the rest form a sort of background for it ; but it is quite possible, if we are tired or listless, that we notice nothing at all, and are only vaguely aware of the field of view as a whole. Even if we notice some object, we are usually aware of it only as a whole ; or, if we notice some part of it, that part, again, is a whole whose parts we do not notice.

It is important that the reader should be quite convinced that there are cases in which we are aware of a whole without being aware of its parts ; although the whole has parts which are easily distinguishable. This will appear clearly if we take, as our first example, one in which the parts are all of the same kind and have no natural divisions. A good example of this sort is Mr. Russell's instance of the sheet of white paper. This, he says, " may be seen as a single undivided object, or as an object consisting of two parts, an upper and a lower or a right-hand and a left-hand part, or again as an object consisting of four parts, and so on ".¹ But it will be admitted that our usual way of seeing a sheet of white paper is as a single undivided object.

¹ " On the Relations of Universals and Particulars ", *Proc. Arist. Soc.*, 1911-1912, p. 13.

This is also our usual way of seeing objects whose parts are less homogeneous—*e.g.* a grass plot, a mass of foliage, the ivy on a wall, a rose. We do not notice the individual petals or leaves or blades of grass, but are aware only of the total object. In fact, with everything which we account as one object—a chair, a knife, a book, a door—it tends to be the case that, although it consists of parts which are more or less different from one another, we overlook the parts and are aware only of the whole. Of course, we *may* be aware of the parts, or of some part, as well as of the whole—I do not mean to deny that; my point is only that we also may be, and very often are, aware of a complex object only as a whole.

When we are simultaneously aware of a whole and of its parts, it is because previous experience has left in us habits of reaction and thought by which we are able to adjust ourselves at once to the parts and to the whole. In the absence of such habits, James's statement holds good that "any number of impressions, from any number of sensory sources, falling simultaneously on a mind *which has not yet experienced them separately*, will fuse into a single undivided object for that mind".¹ And we may add that even a mind which has experienced them separately, but whose momentary interest does not require it to discriminate, will in the same situation perceive a single undivided object.

Assuming it to be undeniable, then, that intuition

¹ *Principles of Psychology*, vol. i, p. 488.

of wholes without parts is a fact, let us inquire as to the whereabouts of the missing parts, and as to the means by which they have been suppressed or excluded from our awareness. For, though excluded or suppressed, they are evidently in some sense present, ready to be perceived whenever we turn our attention to them. Our thoughts will be more definite if we consider a concrete example. And, since most objects—a printed word, for instance, or a face—have *meanings*, which it is desirable to exclude because they would complicate the problem, let the object be an aesthetic one, which holds our attention by its mere sensible quality and form: say, a rose. This rose has twenty petals, and they are of varying shades of pink. But we are not aware of the petals, or of their manyness or their variety of colour; we are aware only of the rose as a whole.

Now each visible petal acts, of course, on the retina, and calls forth a sensation of a particular kind,¹ otherwise we could not be aware of the rose; but all these sensations mediate intuition only of a vague whole.

¹ I ask the reader to remember, in weighing my argument here, that I am using the word "sensation" for the bits of sentience—not, as it is ordinarily used, for awareness of a quality. He may prefer the ordinary use, and think my bits of sentience uncalled for. If so, I ask him to consider (1) that, to justify us in calling, *e.g.*, colour a sensation, there must be awareness of this quality as well as the quality; (2) that the awareness is not given, as the quality is; (3) that, consequently, his choice lies between assuming that the brain (or an ego) is aware of the quality, and the doctrine here urged that awareness of the quality is due to simplification and projection of a state of sentience. Only this doctrine, I think, can account satisfactorily for our knowledge of awareness and make its nature intelligible.

Perhaps it will be suggested, in explanation, that while we are distinctly aware only of the rose as a whole, we are obscurely aware of the petals. To say this is to substitute a different case for the one we are considering. I do not deny that, as there are cases in which we are clearly aware of the rose as a whole and at the same time clearly aware of the petals, so also there are cases in which we are clearly aware of the rose and obscurely aware of the petals, or of some one petal. My contention is simply that there are still other cases, and very frequent ones, in which we are aware of the rose as a whole without being aware at all of the petals. And if it be asked how it is possible to be aware of a whole without being aware of its parts, I can only answer that the facts show it to be possible, and that how it is possible is the question we are considering. How plain it is that we can see a tree without being in any way aware of the individual leaves, though each leaf from which light-rays reach the eye evokes its separate sensation; that in the bookcase I may see only a lot of books, not the individual books; that I see the carpet with its complex pattern only as a whole, and see it at the first moment without even distinguishing the pattern from the background. Similarly, we read a word without being aware of the individual letters; we glance at a face, and our attention seizes the general expression and the beauty or lack of it, but we have no awareness of the individual features. In short, with regard to everything which we could discriminate but do not, we are in the position of James's baby who

apprehended the world only as a "blooming buzzing" whole.¹

It is fallacious to suppose that a sense-datum contains any parts except those which it bears on its face. We are prone to commit this fallacy, because we know so well that a rose has petals and a tree leaves ; but that is to foist upon the actual datum a lot of eventual data, which we treat as being actual although they are not in fact given to us.

When we pass from a mere whole to its parts, we pass to a different sense-datum. The point has been well stated ² by Mr. Russell, in discussing his instance of the sheet of white paper. He says : " Visual space may in a sense be infinitely *divisible*, for, by attention alone, or by the microscope, the immediate object of perception can be changed in a way which introduces complexity where formerly there was simplicity ; and to this process no clear limit can be set. But this is a process which substitutes a new immediate object in place of the old one." ³ It is not, then, by discovering in the sense-datum details before unnoticed that we pass from a whole without parts to the parts, or to a whole composed of parts ; it is by substituting for the sense-datum a new and different one.

This undeniable fact, then, that we can be aware of a whole without being aware of its parts, although the

¹ Cf. Dr. C. S. Myers, address on "Consciousness", *Lancet*, Nov. 29, 1924, p. 1109 : "The vague complex . . . precedes the differentiated simple".

² Except for the phrase "immediate object".

³ "On the Relations of Universals and Particulars", *Proc. Arist. Soc.*, 1911-1912, p. 13.

parts are represented by sensations, demands explanation. For the fact, as I said, is a paradox. No man can *possess* a whole—a house, for example, or a bag of money—without possessing its parts ; and it might seem that of the mental possession which we call awareness the same must be true. The ability to explain this paradoxical fact will be a good test of theories of awareness. Let us look at some of these theories, and ask how far they can explain it.

(1) The common-sense notion of “consciousness”, as an activity of intuition supervening upon and revealing real things, has no resources with which to explain the fact. It cannot even state it. Such a consciousness might be capable of degrees, and diminish in vividness from a centre to an outer margin. But how could it fail to show the parts, as well as the whole, of what lies within the margin? How can its illumination fall on objects in such a way as to show them as wholes without showing their parts? How can the marginal line insinuate itself between a whole and its parts?

This theory has no place for the fact that the parts produce in us sensations—sensations which account for our ability instantly to turn our attention to the petals, and without which we could not perceive the rose as a whole. Let us, then, pass to a theory which admits the existence of the sensations.

(2) The traditional doctrine of modern sceptical philosophy is that sensations are converted into perceptions by being “apperceived”—that is, classified and interpreted by means of mental images. And

it might be maintained that the difference between the whole and the parts is simply that apperceptive activity deals with the whole mass of sensation, but not with its parts. I do not doubt that, in any actual case of human perception, apperception may be thus selective; but this fact will not serve as the solution of our problem. For it is one thing to see a rose, another to apperceive it as being a rose; and what we are trying to explain is the fact that we *see* the rose but do not see the petals.

If objects had to be apperceived in order to be present to awareness, we could never obtain the images with which to apperceive them, because we never could be aware in having the sensations. Moreover, it is in truth not sensations that are apperceived, but apparent things; and these are not apperceived by means of mere images (that is, faint copies of sensations), but by means of revived apparent things. Association, by contiguity and by similarity, is the guiding thread of apperception; and association connects objects of awareness, not sensations. The relations on which it is based are relations first given between the parts of the sensibly perceived.

There is thus a function of *apprehension*—of sensible acquaintance with things—which is antecedent to apperception, and which can show us a whole without showing its parts. Apperception, therefore, is not the true solution of the problem.

(3) The traditional doctrine is right in so far as it holds that sensations are transformed into perceptions by “activity”: but the activity is that of the body,

and not merely of the mind. Awareness, as we have seen, is correlated with a process in the entire sensori-motor arc. Mere sensation—visual, auditory, tactile—accompanies the first or sensory part of this process ; and there is also muscular and perhaps motor sentience, an impulse to act in a certain way and a sense of having done so, accompanying the second or motor part of it. The choice of the proper movement, which is made in passing from the sensory part to the motor part, is the essence of the act of adjustment ; and although it happens in the nerve-centres, it *implies* that adjustment to the external thing which takes place when the movement is executed.

Here, then, is the “action” or “activity” which gives to sensations the power of signifying an object, and so generates the sense-datum. Now there are two possible cases. The sensations may be of such a sort that they tend to produce movement only collectively. In that case we are aware of the object as a whole without being aware of its parts. Or the sensations may tend, each on its own account, to determine movement—besides the reaction to which they prompt as a group, they may tend, and be felt as tending, to produce other reactions which are reactions to the sensations individually. In so far as this happens, we are aware of the parts as well as of the whole. If, when we see a rose, we are moved to look at or to touch the petals, we see them as well as the rose ; if our action is addressed only to the total rose, we see only that.

Thus sensations are transformed into perceptions

not by thought, but by action. We never notice or perceive anything except so far as sentience produces or (in case it meets with inhibition) tends to produce movement. Attention, without which there is no awareness, is the beginning of movement.

Furthermore, by this co-operation in determining movement, this "integration", sensations become fused or summed, and their variety of quality is simplified away, so that the datum intuited is only a vague whole.

II

The Specious Present

The different characters which thus fail to produce any effect upon awareness—the various shadings of the petals, the lights and shadows on the leaves of the tree—are differences in space, and it is these spatial parts which simplification causes to disappear. If doubt should still be felt whether they wholly disappear, I think it will be removed by considering the parallel case of the disappearance of temporal parts.

Time makes its first appearance before the mind in the form of the "specious present". That this present really is in part specious, may be seen from the fact that it shows us an interval—the interval next preceding the present instant—without showing the parts of that interval; and shows it as a mere *now*. In reality, time is infinitely successive—any interval of it consists of parts and ever smaller parts *ad infinitum*, no two of which exist at once: and yet this interval appears to us as a mere moment or flash of occurrence,

destitute of parts and of inner successiveness. This shrinkage of an inconceivably manifold sequence into an apparent unit—by which the lapse of time during which electrons have circled a million million times about their nuclei is shortened into a single moment—is what Bergson calls “contraction” and Balfour “compression”; and there is certainly some colour for the metaphor.

Bergson considers this shortening to be the work of memory. Balfour, as we saw, speaks cautiously of “something resembling memory”. I must now try to show that it is the work of action, and is to be understood in the same way as the simplification of spatial wholes by omission of their parts.

Let us again, for the sake of concreteness, choose an example. A fair instance of the specious present is hearing one stroke of a bell. In this experience there are three different times to be distinguished: (1) the interval during which the bell vibrates and communicates concussions to the air; (2) the somewhat later interval during which the ear and brain respond, and auditory sensations arise; (3) the time occupied by the sound as heard, *i.e.* the specious present. The first and second of these are real times; the third is an apparent time, of which the first makes us aware by means of the second. The first and second times are composed of smaller and smaller parts *ad infinitum*; in the third time these parts are omitted, and it therefore appears as a mere moment or flash of occurrence.

The second interval, since it contains the sensations, is that by means of which the awareness of this

moment must be explained. Since this interval is temporally extended, and awareness of the moment cannot arise until the end of it, it might seem that this awareness is in its nature a looking back by the end of the interval (I mean, by the sensation which forms the end of it) upon its earlier parts : and that, accordingly, we have here a phenomenon of memory. Memory, as we know, often omits items and shortens in the retrospect. In looking back at a railway journey I may remember a bridge, and find on repeating the journey that there were three bridges. Memory would be a terrible burden if it did not abbreviate. But further consideration will show that this is not the right hypothesis.

For what we apprehend in the form of the specious present is not the second or internal interval, but the first or external one, the stroke of the bell ; and we apprehend it as a single whole, a flash of occurrence. Thus it is perception that is concerned, not memory. Nor is it true that we apprehend the external interval only by means of the end, or the last part, of the internal interval : *the whole* of the latter interval is required in order to call forth the act which adjusts us to the object ; the external interval is apprehended only as a whole, precisely because the whole of the internal interval is required. If we could react separately to the first half of the bell-stroke and to the second half, we should be aware of two external events, not of one.

The true agency of simplification, therefore, is not memory but action. The external interval appears as

simple, as a mere moment, because we are unable to react to its temporal complexity. As we are organised on too large a scale to permit of our seeing atoms, so our powers of adjustment are too laggard to permit awareness of anything smaller than this moment. If we were as quick in our movements as swallows or humming-birds, we might be correspondingly quick in our acts of apprehension, and the interval compressed into our specious present might be shorter.

That apperception accompanies awareness of this present and puts an interpretation upon the event it contains, there is no reason to deny. But the temporal simplicity of this event is due to apprehension, not to apperception, and it is the "unity of apprehension"—the synthesis of sense-elements required for evoking a movement—not the "unity of apperception", of which we ought here to speak. In fact, since apperception is effected by means of revived apparent things, containing, like the original ones, relations, the unity of apperception is only a complicated case of the unity of apprehension, and hardly deserves the distinction of a special name.

If time is apprehended only in compressed moments, how do we apprehend anything so essentially continuous as motion? For we do of course apprehend it, and even have sensible evidence of its continuity. To understand this, we must begin by distinguishing between sensible awareness of motion—the so-called "sensation" of motion—and apperceptive awareness of motion as such. The sense-datum of an object in motion is exactly analo-

gous to the sense-datum of an object at rest : neither of these sense-data contains temporal extension or duration, both occupy a mere moment or specious present, and the motion or rest is present in them only as a quality. That we may be aware either of motion or of rest *as such*, some opposition of the present to the immediate past is requisite—and the new functions of primary memory, to bring this past before us, and of apperception, to interpret the present in the light of it, are indispensable.

These functions are new kinds of apprehension ; but they need cause no difficulty to our theory, which analyses every act of apprehension into a state of sentience and a tendency to react. In primary memory a fading sensation, or a mental image left behind by a sensation, causes us to react as if it were now too late to react—as if the object were *no longer present*. This tendency to check or refrain from action projects the image or sensation into the past. It is the opposite of the tendency to prepare for without actually engaging in action, which is characteristic of expectation and which projects an image into the future. Awareness of time or of motion *as such*—that is, as involving a relation between past and present—is more complex. We must suppose that here there are two simultaneous states of sentience, a fading sensation or image and a fresh sensation, each with its own motor tendency, and also with the connexion between the two motor tendencies that has been established by our passage from the old sensation to the new sensation ; and that attention

vibrates between the two. The line of vibration, the connexion between the old object and the new object which we follow by this movement of attention, is the temporal "relation" between the immediate past and the present. When the two sensations are different in quality, this relation is one of *change*; when they are the same in quality, it is one of *duration*; in either case it is a relation of *succession* and of *continuity*.

When once continuity has thus been apprehended as a relation between the immediate past and the present, it can be used for apperceiving the mere "sensation" or sense-datum of motion in the other, interpretative way; and we then become aware that even the compressed time within the sense-datum is really (*i.e.* in the object) composed of parts, which succeed each other as individual sense-data do, and that time is divisible *ad infinitum*.

III

Sensible Qualities

Thus far we have been occupied mainly with the negative aspect of simplification, as giving rise to sense-data which temporally or spatially or both are without parts and simple, although there is no such simplicity either in the sensation or in the object. By this process reality has been impoverished rather than enriched; unless we consider that simplicity to be an enrichment. Of course, in most sense-data the parts are more or less emergent. Yet it is extra-

ordinary by the aid of what simplified summations of things, what mere symbols, our everyday life is conducted. We rarely see a rose ; we merely catch a glimpse of a rose, in which every detail is lost to view.

Vague and inchoate as this glimpse is, it is yet definite : it has a perfectly well-marked and recognisable quality, differentiating it from other sense-data such as that of a lily or a leaf. Our instant recognition of each of these objects is just our knowing how to act. Animals make use of such non-discriminate totals as these to adjust themselves in the minutest way to objects—as when a cat springs from a height, a flying bird snaps at an insect, or a Parliamentary orator sees in an inner glimpse the situation, the goal in view, the next thing to say. The habits of reaction here are too definitely organised to need more than a vague sensory clue to evoke them.

The sense-datum, then, although non-discriminate, has a perfectly definite colouring or quality. This quality is a sort of resultant of all the sensations and impulses aroused in us by the object. It is as if these had been mixed together into a brew, with a flavour of its own ; and it is natural that psychologists should speak of the process as “fusion”. There is this justification for the term, that sensations which, if they came separately, might give rise to sense-data having particular qualities, may, if they come together, produce a sense-datum with a quality intermediate between these and partaking in some sort of them all. The objection to the term is, that it is not the sensations which by their union form

a new sensation, nor yet the sense-data which by uniting form a new sense-datum ; but the sensations by exciting a single act of attention give rise to the new sense-datum. There is no union of sense-data. The factors and the resultant do not belong to the same category.

With this caveat, we need not hesitate on occasion to speak of the process as "fusion". It is important, however, to distinguish genuine cases of this process from cases in which stimuli have been fused before affecting the sense-organs, and in which, therefore, there is no such co-operation of separate sensations. The taste of lemonade, according to James, is a simple quality ; but is the simplicity due to psychological or to such physical fusion ? That the fusion of the various sounds produced by an orchestra is largely physical, would seem to follow from the extreme simplicity of the mechanism that suffices for their reproduction in the gramophone. But the respective shares of physical and of psychological fusion in these cases must be left to be determined by sense-physiologists.

Genuine cases of psychological fusion may be compared to those physical unions in which the resulting compound has qualities differing from those of the elements, although the elements remain intact within the compound—as when H and O combine to form water. The atoms of these two gases are the same atoms that, in combination, form water ; similarly, the sensations do not lose their character or their separate identity in giving birth to the sensible

quality, but remain as its existential ground. Hence the metaphor of "mental chemistry", by which fusion or simplification has sometimes been designated, appears completely justified.

Where the sensations fused are the same or nearly the same in kind, it is easily credible that they should yield a single quality. Thus an experiment of Sherrington's makes it probable that there are separate sensations for each of the two eyes, which by fusion produce the visual field;¹ and it is easy to believe that the like sensations called forth through corresponding points of the two retinae should yield a single quality. But even where the sensations differ in kind, this need not prevent their producing such a quality. The typical instance of this is the *coenaesthesia*, where sensations from all parts of the body combine to produce a general sense of well-being or of discomfort. Another example is the characteristic colouring of an emotion, such as fear or anger—names which are given just because of the simplicity of the quality. When ice looks cold or velvet smooth, is it because a tactile or a temperature image is fused with the visual sensation? Even our visual sense of depth and magnitude, as we have seen, may be due to the

¹ *The Integrative Action of the Nervous System*, p. 381. Stumpf, in like manner, finds sensations that are not actual data of observation indispensable to his task of explaining the psychology of music: see his *Tonpsychologie*, vol. ii, pp. 39 ff. In his book entitled *William James*, p. 28 note, he remarks sadly that James "findet meine 'Mehrheitslehre', welche die Annahme nicht unterschiedener gleichzeitiger Empfindungen einschliesst, unvereinbar mit den Auffassungen seines Buches", the *Principles of Psychology*. Two such profound and critical investigators as Sherrington and Stumpf may well be listened to with respect.

fusion of motor and muscular sentience with the purely visual.

Where the sensations are so disparate as apparently not to be fusible—as in the case of the simultaneous sight and sound of a bell—it seems to me, none the less, that for the ordinary perceiver they yield a single undivided sense-datum. And this may explain why, when vision, hearing, and touch occur simultaneously, we do not conceive ourselves to be experiencing three distinct spaces, but a single space in which the visual, auditory, and tactile qualities of objects co-exist harmoniously.

In none of these instances do as many qualities appear as there are co-operating sensations ; but there always tends, in the absence of discrimination, to be a single quality, which is the net effect of all the sensations collectively, and which is different for each combination. Being different, this quality constitutes a symbol, which is sufficient for the purposes of action : why should we attend to details, when the right action may be prompted by a vague whole ?

The many examples of the disappearance of parts and emergence of apparently simple qualities which we have now considered should encourage us to raise the question, whether sensible qualities such as red, sweet, warm are really as irresolvable and ultimate as they at first sight appear to be.¹

¹ That they are, in the sense here explained, not ultimate, is a conclusion to which philosophers of the most various schools have come : Spencer, *Principles of Psychology* (New York ed.), vol. i., pp. 148-154 ; Bergson, *Matière et Mémoire*, pp. 30, 64 ; Holt, in *The New Realism*,

Ultimate and irresolvable as sense-data they unquestionably are. No one, by intending his mind, can see red to be composed of non-red elements. By examining red blood-corpuscles under the microscope, it is true, we can convince ourselves that the parts of red objects are not always as red as the wholes ; but this, of course, is not a resolution of the sense-datum into other sense-data.

There are border-line cases, such as the transformation of a series of clicks, with increase of rapidity, into a tone, which, if we could be sure that the clicks are as separate in the brain as they are externally, would amount to an experimental proof that simple sensible qualities can arise by summation. The simplicity of the quality, despite the many separate click-sensations underlying it, would then be like the oneness of the specious present despite the fact that this interval really consists of many successive parts of time. If the tones are interrupted by intervals of silence, each tone may, in fact, occupy a specious present, and the simplicity of its quality and the unity of this present may be due to the same cause. They may be due, that is, to the fact that, when the clicks succeed each other with great rapidity, we cannot react quickly enough to be aware of them individually—just as we cannot react quickly enough to be aware of hundredths of a second.

pp. 308-355 ; Strong, *The Origin of Consciousness*, pp. 309-317 ; Drake, *Mind and its Place in Nature*, pp. 118-131. Surely Leibniz was not wrong when he said, in the preface to the *Nouveaux Essais*: “ En un mot, les perceptions insensibles sont d'un aussi grand usage dans la pneumatologie [= psychologie] que les corpuscules dans la physique.”

The parts, to the fusion of which tones owe their quality, appear to be temporal rather than spatial ; though, since many nerve-fibres must be concerned in producing even the simplest sound, spatial parts doubtless enter into the fusion as well. In the case of colours, we need not attempt to decide what are the shares of temporal and of spatial parts respectively in producing the quality. It is sufficient to say that, on our hypothesis, qualities such as red and blue and green are due to complex spatio-temporal arrangements of parts of sentience, which are simplified because the parts are too fine to prompt us to reaction individually, and are projected because our action is addressed to the external thing.

These parts, of course, are not individually red and blue and green. To ask of what colour they are, is as unintelligent as to ask what is the colour of atoms and electrons. The question implies sensible apprehension where no organs for such apprehension exist, and where the nature of the quality apprehended would depend on the constitution of the organs ; and the possibility of asking it is no more an argument against fine parts of sentience than it is against atoms and electrons.

A more reasonable question is how mere spatio-temporal arrangements *of like elements* can give rise to qualities so definite, and so unlike one another, as red, green, blue—or, still more, as light and sound and warmth. This question may mean (1) how the spatio-temporal arrangements can be sufficiently different. To that the answer is, that no one can at

present say how different the physical processes in the areas of the cortex corresponding to the different qualities are—what chemical and electrical reactions may take place there, how these may be varied, spatially or temporally spaced, intensified, etc. If the question means (2) how arrangements of parts of sentience, of any degree of difference, can give rise to qualities so simple as red and blue, the answer is that, on our hypothesis, red and blue owe their simplicity wholly to our inability to resolve them. It is true that this inability is a settled fact of human nature, and that, consequently, red and blue are definitively simple *for us*. To this it may be rejoined that, in that case, experience is essentially constituted by its limitations: if we were not incapable of certain reactions, we should not experience things as we do. This is a just observation, but it does not weaken the case for psychological atomism.

It seems needless to illustrate the process of simplification by further examples, since its nature has now been fully explained. I will only add that, the more closely we scrutinise sensible objects, the more do we find them to be pervaded by time with its continuity. The times we apprehend are like islets rising out of the deep, but joined by a continuity that is out of sight. And this makes it probable that continuity extends even to the qualitative aspect of experience, and connects intelligibly sense-data which without it would be incommensurable, essentially different, ultimate.

IV

The Inefficacy of Mere Forms

Lest this attempt at an atomistic psychology should be lightly condemned, as inconsistent either with the reality of relations, or with the organic character of the bodily process and consequent unity of the self, or with the transcendence and validity of knowledge, I want now to restate, with special reference to these points, the assumptions on which it is based, in the hope of thereby removing any lingering misconceptions.

The hypothesis is one of atoms, and atoms, of course, involve a certain discreteness; but the reader must not conceive my bits of sentience as having gaps of nothingness between them. The atomic theory in physics is now well established, and it would be unwise, in view of the intimate connexion of consciousness with the nervous system and the possible identity of physical being with sentience, to rule out atoms *a priori* in psychology. On the other hand, if in the world *qua* physical there is a continuous medium or aether, there must on this hypothesis be a similar continuity in the world *qua* composed of sentience. If to the ear of any reader the word "atomism" has an unpleasant sound, he is at liberty to substitute for it "pluralism"—or, what would be the most accurate term of all, "synechism".

The fundamental assumption of the hypothesis is the continuity of space and time. That all things, the self included, are in space and time, and that these

are continuous, seems to me so unquestionable a fact about Nature that we may safely base all our reasonings upon it. How continuity should be analysed—whether into points and instants arranged compactly, or into smaller and smaller parts *ad infinitum*—may be left for consideration in a later essay. All we need note, for the present purpose, is that, when things are spatially or temporally continuous, they are necessarily, except at single points or instants, plural—that is, distinct as to their existence. This is shown by the fact that they can be divided: that a thing in space can be broken in two, that an event in time can be interrupted. Such “unity”, then, as we attribute to any spatial or temporal whole must be consistent with the distinct existence of the parts: it must not be conceived as welding them inseparably into one existent. It is a question whether, in the interests of clearness of thought, the word “unity” should not be discarded here, and replaced by “wholeness” or “totality”.

Relations, again, must not be so conceived as to contradict continuity. That is, it must not be assumed that an underlying unity of the above-mentioned existential sort is necessary to their really obtaining. To their being apprehended a unity is necessary, but it is the unity of apprehension, and this unity is purely functional; it is a fallacy to transfer this spiritual unity to relations as they are *in rerum natura*. How their obtaining there is compatible with Nature being merely continuous, is indeed a question. May it be because spatial and temporal relations are

really composed of smaller relations *ad infinitum*—*e.g.* the distance between the top and the bottom of this page composed of the distance between the top and the first line, that between the first line and the second, and so on ; the interval between noon and midnight composed of the interval between noon and 1 o'clock, that between 1 and 2, etc. ?

However this may be, it is clear that spatial and temporal relations presuppose distinct existents as their terms ; and, consequently, that such “organic wholeness” as belongs to the nervous process or to the total bodily process consists only in a proximity and a co-operation of distinct existents. Of course the stability of any structure depends on the nature of the relations between its parts ; but, so far from contradicting distinct existents, this fact implies them.

What is true of the nervous process will, on our hypothesis, be true of the highly organised mass of sentience which forms its inner being or intrinsic nature. Whatever this mass of sentience, this self, is able to effect in the way of cognition or of action will be a result of the co-operation of its distinct parts. When the self cognises a complex object, it must in some sense absorb into itself the special character of this object—a self apprehending one thing must be differently affected from a self apprehending another : this, on our hypothesis, is made possible by the extension and duration of the self. Thus, when I see a landscape, as many separate parts of myself must be differently affected as I am able to distinguish details within it ; when I hear a melody,

my self must have passed through a sequence of different states. Thus the "unity" or "organic wholeness" of the self is in no way inconsistent with its being composed of distinct parts. Far from being simple and indivisible, the self is divisible and composite, like the nervous process; its unity is a unity of organisation.

Finally, the transcendence involved in knowing receives due recognition on our hypothesis, which explains it as consisting in the use of a state of sentience as a sign. Strictly speaking, it is only the significance—the object as known—that is present to the mind. But since the object as known coincides, in so far as the knowledge is true, with the thing as it exists, it is really the latter that has been made present to us; and knowledge on our hypothesis is really transcendent. Its transcendence has been made possible by a phantasm—produced by the fiction that sensations are outside us, though really they are inside, and that they are simple, though really they are complex: nevertheless it will be evident that, on our hypothesis, we are justified in our natural confidence that by means of this phantasm we have attained to a knowledge of fact.

III

ON THE RELATION OF THE APPARENT TO THE REAL

THE question at issue between neo-realists and critical realists is one that, with our present knowledge of the physiological concomitants of perception, and with the various theories of this function before us which have been proposed by philosophers during the last three hundred years, it should not be beyond the wit of man to determine ; though the determination might fall out in a way not wholly accordant with the claims of either school. Let us see what these claims are.

The essential principle of neo-realism is the identity of the real thing with the apparent thing. This identity is necessary to the possibility of knowledge : for, unless in perception the real thing appears, no inference from what appears can justify our belief in a real thing ; from what other source indeed than perception could our knowledge of it be derived ? Such an inference is not defensible logically : for, in order to infer a real thing, we must possess a conception of it ; but all conceptions have their origin in perceptions ; and if perception reveals only apparent things, we can have no valid conception of anything else, and it is only other eventual apparent things

that we can be justified in inferring. This logical consideration is the strong point of the neo-realist. He draws from it the conclusion that real things are in no way distinct from apparent things, and that appearance is the stuff of which the real is composed.

The critical realist points to the fact that some apparent things—the supernumerary object when we see double, the illusory object when an after-image is projected—are *not* physically real. He explains how such unreal things can appear by referring to the physiological psychology of perception: if an impression on the organism happens to be ill-fitted to convey the outer existent correctly, what appears is more or less unreal. Psychology is the critical realist's strong point. He asks the neo-realist, moreover, how, if the appearing is intrinsic in the thing (as some neo-realists maintain), the thing can exist when it does not appear. Surely appearing is extrinsic to the being of things, an occasional and adventitious relation to a self. And this relation must be of such a sort that a thing can sometimes appear otherwise than as it is. Hence he concludes that, even when things appear as they are, the apparent thing and the real thing are distinct.

In each of these contentions it seems to me that there is a large element of truth; and in the following I shall try to suggest a view which, while it is a form of critical realism, does justice to the important element of truth in neo-realism.

1. *Apperceptive Interpretation Excluded.*—Perception, in human beings, of course normally involves

apperception—that is, interpreting in the light of past experience the objects sensibly given at the moment—and without this apperceptive addition to present acquaintance we should not be as wide awake and fully conscious as we are. The lower animals are less conscious than we because they interpret so little. Nevertheless in analysing perception it is desirable, if we would understand its nature aright, to omit this apperceptive element, and ask what may be the constituents of the perceptive act in such an animal, say, as a newly hatched chick. The chick has had no experience, yet we cannot doubt that it sees the grain of corn or pebble at which it pecks.

2. *The Three Ingredients of Perception.*—Perception, even in the chick, involves three things: *intuition*, *intent*, and *animal faith*.¹ These are not separate acts, occurring successively, or that may be performed independently of one another; as is shown by the fact that all three rest on the same bodily process—the motor reaction to sensory impressions. They are only aspects of the one act of perception. Let me show this in detail; I will begin with intent.

(1) Intent is reference to an object. When the chick looks at a pebble, its optic and head muscles

¹ I make use of the excellent terms chosen by Mr. Santayana, with whose doctrine of perception mine agrees in most respects. I think it important, however, to insist more strongly than he does that intuition is not a separate act, but only an ingredient of the one act of perception; and that the sense-datum, accordingly, while in its nature an “essence”, is in perception always predicated of a real thing, and therefore, in use, a particular. Only thus, it seems to me, is it possible to avoid representationism and vindicate the claim of perception to be direct acquaintance (false or true) with the external thing itself.

are adjusted so as to bring the image of the pebble upon its retina: the object seen, therefore, is that external thing towards which vision is directed—that thing, and no other, has been selected as that with which the chick's mind has to do. This selection of and reference to an object is what is meant by "intent".

(2) Only so far as a thing is thus selected by an action or attitude of the chick's body is the visual impression (the state of the chick's self produced by the action of the thing) projected and simplified, in such wise that there is an object before its little mind. Apart from simplification and projection, the impression is merely *in* the chick's self: only by these processes does something come *before* the self. "Intuition" is a name for that aspect of perception by which something is before the self sensibly—it is a word for the "givenness" of the sense-datum.

(3) But when an animal reacts thus unquestioningly and, as a result, has a sense-datum present to its intuition and an external thing present to its intent, the unquestioning reaction or attitude predicates the sense-datum of the external thing, and so is an assumption that the object given is real. That the chick makes this assumption may be seen from the fact that it thereupon pecks. Belief never occurs except in this automatic way; though in human beings there may be an added emotion of confidence, and even the chick of course has a kinaesthetic sense of its behaviour or attitude. As Spinoza says about the boy and the winged horse, to think of an object unquestioningly is to suppose its existence. Doubt

never comes except as a secondary act, by which that which has first been supposed real is deemed open to question. The primitive attitude of mind in perception is one of "animal faith".

Intuition, then, never occurs in ordinary life except as an aspect of an act which is one of reference to an intended object and of animal faith in its existence. It is this real thing that we intend, and (more's the pity) suppose ourselves to intuit.

To these three aspects of the perceptive act three aspects of the object as perceived correspond. We may say that what intuition discloses is the apparent shape and quality of the thing, that what intent grasps is its position in space and time, and that animal faith assures us of its existence. These three aspects of the object come unitedly and undistinguished, for the judgement which acquaintance involves is only an implicit judgement. Let us now inquire as to the conditions in which a distinction between them is made.

3. *The Apparent Thing.*—The first distinction made is between the thing as existing and the thing as present to the mind.

We not infrequently discover that a thing which we perceived was not real but only apparent. This occurs when subsequent perception fails to verify a previous perceptive act; as when I find that an object seen with the margin of the retina was not, as it appeared to be, a cat, but a phantom due to projection of a spot on my glasses—for when I look directly at the place, there is nothing there. Merely

apparent objects are frequent occurrences, and everyone knows that they do not form part of the physical world. In ordinary life the distinction between the real and the apparent is a distinction between apparent things that are real and other apparent things that are unreal; it being taken for granted that things are capable of appearing just as they really are.

The physicist carries this distinction to a further point when he informs us that colours do not exist as such in physical things; for the colourless things are now incapable of appearing. Nevertheless no one doubts that the physical arrangements that appear as and are symbolised by colours really exist. Thus, purely on physical grounds, there is a well-authenticated distinction between things as they appear and things as they really are.

The conception of the merely apparent arises whenever any one, philosopher, physicist, or ordinary man, after perceiving a thing which he believed to be really there, sees reason to doubt whether the thing was there just as he saw it. He has now introduced a second, more abstract awareness of the object or the real (an awareness no more immediately intuitive of the thing itself than the original perception was), and with this abstractly conceived object he contrasts the object as perceived, which latter thus becomes a non-existent or a doubtfully existent object. This unreal or doubtfully real object is the "apparent thing".

We may call the philosopher or ordinary doubter the "critic of knowledge". In naïve or uncritical

perception the apparent thing is taken to be identical with the real thing. The apparent thing as distinct from the real thing is an object which exists only for the critic of knowledge, and which has been brought into existence as a separate entity by his doubt. It has been brought into existence by cancellation or suspension of the animal faith normally characterising perception.

In many cases the critic of knowledge will be obliged, after due consideration, to recognise that his doubt was unjustified. Whenever this occurs, the apparent thing will for him cease to be merely such and will become again a truly appearing real thing. When, on the other hand, his verdict goes against the apparent thing, the latter becomes *merely* apparent—an object perceived but non-existent.

4. *False Perception*.—Objects may be perceived, and yet not exist physically. There is such a thing as false perception, or as an element of falsity in perception—and that it cannot be wholly explained by erroneous inferences or mistaken apperception, such cases as double vision, projected after-images, optical illusions, the voices heard by the insane suffice to show.

The error in these cases does not consist in attributing a wrong context to things which, in themselves, were correctly perceived to exist: it consists in perceiving something to exist which in fact does not exist. The eyes are directed at a certain spot, where something exists that might be perceived; in that spot something is seen which is different from

what really exists there—as when, owing to the projection of an after-image, we see on a wall a red spot at a place where the wall is really white ; and what we see is therefore something that does not exist at all.

It exists, of course, in the sense of being seen, but not in the sense of being a part of Nature. For there is no such existent at that point on the wall ; nor is there any such existent elsewhere, for the visual impression by means of which we see the spot is in the head, not where the red spot is seen, and has neither the particular magnitude nor the red quality characterising the red spot. This last is therefore a phantasm, whose whole “existence” depends on being seen, *i.e.* on the simplification and projection of the state of the self. And even apparent things which are not merely apparent, but appear as they really are, owe their appearing to the simplification and projection of states of the self, and are therefore, *qua* apparent, “ideas”, whose only *esse* is *percipi*.

5. *The Sense-datum an Essence.*—The apparent thing which the critic of knowledge distinguishes from the real thing is a datum of intuition and intent combined, only the aspect of animal faith having been cancelled to produce it. An entirely different distinction is that between the apparent thing and the sense-datum. This distinction is made by further eliminating from perception the aspect of intent or reference to the externally real, and considering only what is an actual datum of sense—what is “obvious”, as Santayana says.

Now the sense-datum may be considered either in use, that is, as predicated of a real thing (this is impossible without intent), in which case it has become a particular, referred to the here and now ; or in itself, apart from all predication and merely as that qualified shape which it actually is—and in that case it is a universal, unreferred to any position in space and time, and only possessed of a certain kind of logical being. It is what Santayana calls an “essence”. And I think it cannot be denied that sense-data, when abstracted from the perceptive situations in which they occur and considered in themselves, are essences.

6. *Awareness or Acquaintance*.—We may now draw the conclusion respecting perceptive acquaintance which follows from the above analysis : namely, that perception has no other object than the real thing itself. There is indeed a distinction between the thing as it really is and the thing as it appears : but this is a distinction drawn only by the critic of knowledge and dependent on his doubt. When or in so far as his doubt is removed, the apparent thing and the real thing coincide for the mind and are one. There is likewise a distinction between the sense-datum and the real thing with which we become acquainted by its means : but this is a distinction between what is present to bare sense and what is present to intent, and in perceptive acquaintance intuition and intent are not separate acts but only aspects of the one act of perception.

The notion of an “immediate object” of perception, distinct from the real thing and necessary to

cognition of it—an immediate object which is itself the only object of acquaintance, and which indeed, when things in themselves are denied, replaces them as the real thing perceived—arises through hypostatizing either the apparent thing or the sense-datum into an existent necessarily possessing the characters which it appears or is intuited as having. Acquaintance then becomes infallible. Error is possible only through misinterpreting that with which we are infallibly acquainted. I think the preceding analysis will have made clear the baselessness of such a theory.

7. *Introspection*.—How comes it, then, that excellent minds are so helpless against this fallacy ; that, indeed, philosophers for the most part seem incapable of taking due account of the psychological conditions of perception without falling into it ?

The reason may perhaps lie partly in a complication that has not yet been mentioned. There is another subsequent act, distinct both from the discovery of the apparent thing by the critic of knowledge and from the discovery of the sense-datum by the analyst of perception, namely, the psychologist's act in cognising the state of sentience or sensation ; and these three diverse objects—apparent thing, sense-datum, and sensation—are easily confused. Introspection of the sensation corresponding to a given sense-datum involves an altered reaction, one addressed inward not outward, and therefore gives rise to a new apparent thing, which, since no place can be found for it in the world as it appears to perception, is of a non-physical sort.

In an earlier essay I have pointed out how the ordinary man becomes aware, when a light is too brilliant or a sound unpleasantly loud, that he has not to do solely with an existent outside his body, but also with a state of himself. His attention has been drawn to this state by its intensity and unpleasantness. It follows that, even when we see indifferent lights and colours or hear indifferent sounds, we do so by means of states of ourselves to which it would be possible for us to turn our attention. When we turn our attention to them, something appears, which in one respect is very like the object given to perception, since it is made present to us by the same state of ourselves which, a moment before, we used in perceiving ; but the altered direction of our attention has given to our cognitive act a new intent, so that now it refers to something within our bodies as its object. The critic of this new kind of knowledge may legitimately doubt whether what is within our bodies is exactly like the brilliant light or intense sound—at least, it is a fair question, just as it is in external perception, how far the introspective datum presents the state of the self truly, and how far it is due, for instance, to such a process as simplification.

But in any case it is very important not to confuse the apparent thing in introspection with the apparent thing in sense-perception, or either of them with the sense-datum : the first of these being (in appearance at least) psychical in its nature—that is, composed of feeling—while the second is physical, and the third, as we have seen, is a mere essence. It seems to me

probable that current phenomenism is partly due to this confusion.

8. *Animal Faith*.—It is by animal faith in perceptive predication, and by that alone, that we apprehend the existent (as distinct from the merely apparent), and become assured that we really have to do with it. And it is equally by animal faith that, in introspection, we become aware of the reality of the self. *Cogito ergo sum* is not valid if it is an inference from the introspectively apparent to the real, or from a supposed observation of awareness to the subject that is aware. It is valid only as a truism pointing out that, *if* I think, I must needs exist; but *that* I think can be known only by reflection upon the combined deliverances of perception and of introspection.

The need for animal faith, or instinctive trust, arises from the fact that knowing is a relation between distinct existents, and that the knower consequently, as Aristotle says, cannot take the real being or substance of the known thing into himself, but can only take its "form". Form is perhaps not the right word, for the knower takes into himself not only the whatness of the known thing by means of intuition but also its thatness or thereness by means of intent; but takes them into himself only as something asserted and believed. What the knower has in himself is the assertion of such and such an existent; without which, indeed, he would not know at all. As Santayana admirably says, knowing is "a salutation, not an embrace".

I see no reason why animal faith should be restricted to the mere *existence* of what is beyond or

within us, and should not be extended so as to give us equal assurance concerning the *nature* of that which exists. The difficulty, of course, is the frequent occurrence of false perceptions (and introspections?). But we judge these to be false precisely because they fail to accord with other, vastly more frequent perceptions, which, therefore, we esteem to be true—we regard dream phenomena, for example, as unreal because they do not accord with the percepts of waking life. These last, again, more and more reveal a definite order, permitting of prediction. And, since human life depends on recognising the objectivity of this order, doubt as to its external existence appears capricious. It seems to me that a man should no more doubt the reality (in some form) of space and time than the existence of something besides himself.

Difficulty, indeed, arises when we try to understand the relation of the self to the rest of reality. But if the self is the *object* introspected—not merely the datum, either of introspection or of perception—there is no reason why it should not be in space as well as in time, and be the real thing which appears to sense-perception as the nervous process or the entire bodily process.

I think our principle should be to accept the deliverances of cognition, both perceptive and introspective, as to the nature of the real except when they contradict one another; and, in cases of contradiction, to weigh carefully which of two mutually contradictory apparents deserves the more credit, in view of all the circumstances. The result will be that, instead of

doubting whether the real is in space and time, doubting whether it is physical or psychical, we shall recognise that it is all these things at once; and I do not believe that any ultimate difficulty will be found in reconciling these diverse characters of the real with one another.

9. *The Precariousness of Cognition*.—What the critic of knowledge (or epistemologist, as we ordinarily call him) has really discovered is not an “immediate object” distinct for intent from the real thing and cutting us off from it, for the object of intent is the real thing, and the real thing may appear truly; but rather a truth applying to all cognition, perceptive and introspective alike: that the apparently real may not be so. Cognition, in other words, is *precarious*—it is capable of yielding error as well as truth.

The psychologist can explain how this is possible. It is possible because perception (to take that case) is effected by using a state of the self, an impression on our being no more intrinsically referent to an object than the correlated nerve-process, as a sign of the external thing that produced it. To use states of the self as signs is to simplify and project them, as we do by reacting. These processes bring the resulting sense-datum in some respects nearer in its characters to the external thing signified, yet the sense-datum still remains to a large degree symbolic.

Thus, while perception is acquaintance with the real thing, it is not *infallible* acquaintance with it. It is not intuition of the real thing itself, as phenomenalist theories suppose. Nor, on the other hand, is it

mere representation, by means of an immediate object which alone is given to acquaintance ; for the aspect of intent deals directly with the real thing and with nothing else, and the predication of the sense-datum of the real thing brings that thing sensibly if to some extent erroneously before us. Perception is *fallible* acquaintance, and, in so far as true, *virtual* intuition. These phrases, I think, hit off its nature with a fair degree of exactness—a delicate matter, in the case of a function so oddly combining strength and weakness that philosophers almost inevitably emphasise unduly either the one or the other.

10. *The “Infallibility” of Intuition.*—Thus it is an error to infer, from the fact that we sometimes perceive wrongly, that what we are acquainted with is always something other than the real thing itself. It is so only when we perceive wrongly ! When we perceive rightly, perception, because effected through the simplification and projection of sense-impressions, is not the less true acquaintance with the real.

These sense-impressions, the only real “sensations”, are in the head, and it is not they or their qualities that we intuit ; what we intuit is the sense-datum. Nor, again, is the sense-datum that with which we are acquainted, but the object of acquaintance is the real thing given to intent, and with which we become acquainted by predicating the sense-datum of it. Thus a vision of the real arises, which is not present to mere sense, nor yet to mere intellect (that is, intent), but to sense and intellect combined. There is no awareness of anything except as intellect helps out sense.

Intuition is sometimes spoken of as "infallible", because whatever sense-datum is present to it unquestionably *is* present. To credit the percipient with even this measure of infallibility is to attribute to him a different intent from that which he actually had. His intent was to have cognitively to do with the real thing, and in this virtual way to intuit that. Calling his intuition infallible is like complimenting a bad marksman on the fact that his shot has very exactly hit the mark which it *has* hit. It is as if a Catholic should defend the infallibility of the Pope on the ground that it cannot be false that he says what he says. The Pope did not mean to utter empty words; the marksman did not mean to hit the side of the target; nor was it the intention of the chick to peck at a mere sense-datum and make his dinner of it. Infallibility should be predicated of an act of knowing, and the only act of knowing that occurred here was perception, which is very fallible.

11. *Source of the Phenomenalistic Fallacy.*—Metaphors are dangerous in philosophy, but perhaps, after the preceding explanations, no misunderstanding will arise if we say that the sense-datum (in use, not in itself) is a *report* made to the self about a real thing. No report would be such if it did not involve a well-understood reference to the thing reported. This reference of the sense-datum to the thing is made by intent. What appears, when the sense-datum is predicated, is thus not the mere predicate, but the predicate as asserted of the subject—a "presentation" is the analogue of a proposition.

The extraordinary error, by which the thing reported is thought to be identical with the report of it, and perception consequently conceived as infallible intuition, is due to overlooking the element of intent always present in perception. Because we do not engage in overt action, sensible awareness is thought to be a mere passive reception ; although in fact it always involves the sort of reaction which is necessary to attending. Thus phenomenalism results. But when this error has been committed, it is easy to go further and, by applying phenomenalism to the self, fuse the sensation with the sense-datum ; with the result of objectivism. The sense-datum presented, for instance, when I look at a flower is confused with the impression on the self by means of which I see the flower, and the real existence belonging only to the sensation is attributed to the sense-datum ; which thus hardens into an existent at once physical and mental.

Not even in introspection is the thing reported either identical or necessarily coincident with the report of it. When, for example, we feel pain, there can be no doubt that we really do feel it, in the sense of having to do with a state of the self which appears thus to introspection. When, looking back a moment later, we say to ourselves that the pain was real, we are noting the fact that the state did really appear as pain—the fact that things really appear in certain ways being the “infallibility” of intuition. But as to the truthfulness of this introspective appearing the thoroughgoing critic of knowledge is justified in raising just the same doubt as he raises regarding

the truthfulness of perception. The state of the self which we cognise as pain is real—there is no need to dispute the ordinary man's animal faith on this point. It may have many of the characters presented by the introspective datum : intensity, greater or less volume, aptness to excite a reaction of aversion—even that psychical or sentient nature which is the most marked characteristic of this datum ; but all this is a question for the criticism of introspective knowledge, a question which cannot be shelved by merely pointing to the obvious fact that pain is felt as such. To argue thus is as if one said, I certainly saw a red flower. The flower was certainly seen as red, but the redness was not certainly in the real flower.

12. *The Fallacy of Scepticism*.—Scepticism such as Hume's, with the erroneous theories of cognition to which it has led—Kant's agnosticism, the transcendental idealism of the post-Kantians, current neo-realism (which may be described as realism of a transcendental sort)—is due to ignoring the element of intent which enters into all perception ; and this element is ignored, because it is not seen that action, or a bodily attitude of some kind, is the necessary physiological basis of awareness.

Sensation and reaction are supposed to be independent of each other ; the passively received impression is supposed to be already awareness of something, and it is not seen that only as the impression is responded to does awareness of anything arise.

This dependence of awareness on response is a consequence of the haphazard manner in which the

function of knowing has been brought into existence by evolution. Nature could give us knowledge of our surroundings only by causing us to interpret our impressions by means of acts. Awareness is not a mysterious power of self-transcendence antithetical to all physical functions: it is a natural self-transcendence effected by the use of sensuous impressions as signs.

These sceptical and phenomenalist philosophies are appropriate, really, to another age—not to that which has witnessed the rise of the theory of evolution and of physiological psychology. Here we are in the midst of Nature, at last provided by her with instruments enabling us to get some hint of our surroundings, and to learn the relations of things sufficiently for the needs of practice: and we venture to doubt whether our environment is real at all—or, passing to the opposite extreme, imagine ourselves endowed with a faculty that puts us in complete possession of it. But it is only by acting as if things were real that we are aware of anything! Even intuition arises only by the help of the bodily reaction. The truth about knowledge is intermediate between the Scylla of scepticism and the Charybdis of phenomenism: we neither apprehend external things with entire correctness and adequacy, nor are incapable of apprehending them.

13. *The Transcendence of Knowing.*—We have now reached a point where it is possible to justify the claim that the apparent thing, when or in so far as cognition is truthful, is identical with the real thing. But first

I must say a few words about the self-transcendence which cognition involves.

Cognition is a reaching out, by the conjoint aid of our senses and our muscles, towards something whose nature is defined for us by the sense-datum, and whose existence and position in space and time are indicated by the direction of our reaching out. Considered simply in its mode of genesis, the sense-datum is a phantasm, whose sole connection with the real lies in its presence to the self. But only abstraction from the complete deliverance of perception makes this fancied thing a *mere* phantasm: for the element of intent has referred it to a certain place, and the element of animal faith has posited it as real. If, then, there really is a thing, such as that defined by the sense-datum, in that place, we have not merely reached out towards this thing but grasped it. Since the defining was by means of the sense-datum, we have grasped it sensibly—that is, virtually intuited it. (This is true, I repeat, only in so far as perception is truthful; and how far it is truthful remains to be seen.) Thus by perception we not only “have to do” with the real thing, but “apprehend” it, and that directly. How can a just view of cognition demand more?

The apparent thing, which arises by predicating a sense-datum of a real thing, is evidently twofold: it is the real thing, but this real thing as it appears to the self. It is the real thing in the form in which it appears. The doubt conceived by the critic of knowledge temporarily severs the apparent thing

from the real thing, but in doing so it does not destroy their intended identity; if it did, what appears could not appear erroneously. Hence the distinction between the apparent and the real is not a distinction between a thing that appears and a thing that does not appear, but one between things as they appear and *the same* things as they really are.

The term "appearance" is a treacherous one, and at all costs to be avoided, because it encourages the notion that the apparent thing is intentionally distinct from the real thing, an immediate object alone given to acquaintance. This is the way in which the fallacy of representationism arises.¹ If the apparent were thus distinct from the real, the real could never appear. At least the above term should never be used in a substantive sense, for *what* appears, but only in a verbal sense, for the appearing. The term "apparent" marks the possible unreality of what appears, entailed by its relation to a subject. But the occasional occurrence of unreal appareants, and the frequent (and indeed normal) occurrence of appareants that are partly real and partly unreal, easily lead us into the error of supposing that *all* that is apparent is necessarily unreal, and of hypostatizing the apparent thing into an immediate object distinct from the real thing itself—in other words, into representationism. From this phenomenalism logically follows, since it is now impossible to pass by reasoning from the apparent

¹ I confess to a good deal of sympathy with the British philosopher who recently wrote: "If any man speak of 'appearances', let him be anathema."

to the real ; and further reflection then leads to some form of idealism or to naïve realism.

14. *Identity of the Apparent Thing with the Real Thing.*—Since the apparent thing is the real thing in so far only as it appears to a self, and since appearing is occasional and adventitious, it might seem that the apparent thing and the real thing are wholly distinct. Of course there is a distinction, but we must proceed more cautiously in applying it. We must bear in mind that the distinction between the apparent thing and the real thing is one made by the critic of knowledge in consequence of his doubt ; but that the naïve percipient makes no such distinction, and that even the critic of knowledge recalls it and reinstates the apparent thing in its identity with the real thing in so far as he finds his doubt to be unjustified. Our position will then be, that in truthful perception (if ever perception is entirely truthful) the apparent thing and the real thing are identical both as to existence and as to character ; and that in untruthful perception they are different as to character but still identical as to existence.

In discussing this identity, then, we must distinguish between existence, character, and the fact of appearing, and deal with these separately.

(1) In intent the apparent thing and the real thing are always identical. The fact that the real thing is outside the self does not prevent the self from pointing to it, feeling this pointing, and so indicating the existent with which it has to do. Intent in perception can refer unmistakably to a certain place ; in memory,

by means of the appropriate kind of reaction, it can refer to the past, and in expectation, by an opposite kind of reaction, it can refer to the future. Intent cannot err: for there always is such a place or such a moment as that referred to, and the place or the moment is always occupied by some existent; so that it is only in the description (by means of the sense-datum) of the character of this existent that error is possible. Even in erroneous perception, memory, or expectation, the apparent thing and the real thing are identical as objects of intent, since otherwise the perceiving, remembering, or expecting could not be wrong.

(2) Identity of the apparent thing with the real thing as to character is made possible by the fact that the sense-datum is an "essence"—an entity not, in itself considered, in real space or real time, and related to real space and time only in that, on the one hand, it appears to me now, and that, on the other hand, I refer it to a place outside me and to present time. If, when I thus refer it, the real thing now in that place has in fact that character, there is identity of the character of the real thing with the character present to my mind, and my perception is truthful both as to character and as to existence. The sense-datum is essentially an "idea", and when referred to an external place it becomes the idea of a real thing—an idea which may be right or wrong. Only when or in so far as the idea is wrong is there non-identity of the apparent thing and the real thing as to character.

Thus, in truthful perception, both the existence and

the character of the external thing are present to the mind, and the identity of the apparent with the real is complete.

(3) The only thing which in truthful perception is additional to the externally real and not identical with it is the appearing—the perceptive act. For this is a relation of the self to the real thing, consisting in reference to it by means of intent and description of it by means of intuition. The predication which results from the union of these ingredients is adventitious to the real thing and only occasional in its occurrence.

This account of the identity of the apparent with the real differs from that offered by current neo-realism, in that it admits the possibility of purely perceptual error—sensible error, as distinguished from error of interpretation—and our theory is therefore a form of critical realism. A view of cognition which, by denying the possibility of erroneous vision, hearing, and touch, allows no place for the criticism of sensible knowledge, and so cannot admit any distinction between the apparent and the real but identifies them absolutely and completely, is justly entitled to the epithet of “naïve”. For it emphasises the logical identity of the two so strongly as to make the psychological explanation of awareness, and in the end its very recognition, impossible. In objectivism awareness is absorbed into the objects of which we are aware.

15. *Doubt as to the Existence of the Real.*—The importance of recognising the element of intent which

enters into all cognition has now perhaps been made sufficiently clear. Let us complete the refutation of scepticism by considering further the third aspect of the perceptive act—animal faith. This too, as we have seen, is originally present wherever there is awareness, in virtue of the fact that all three aspects of awareness depend on the one bodily reaction or attitude. Doubt as to the reality of what is seen, heard, or touched (and, let us add, introspected) can arise only by a second mental act, calling in question the truth of the cognition by which an object has primarily been accepted as real.

The naïve percipient—*e.g.* a young child, or the chick—feels no doubt either that the object exists, or that it really possesses its apparent qualities. No question of any difference between the apparent thing and the thing itself ever occurs to his mind. He behaves as if perception were an infallible intuition of the real. It is the critic of knowledge who brings to light the fallibility of perception ; and the psychologist then explains how perception can be fallible, by showing that the apparently unimpeachable intuition which it involves is due to the simplification and projection of states of the self, which are used as signs of what is external.

The possibility thus undeniably arises that all perceptions are erroneous—that they mis-present the external things, or even that there are no external things.

To suppose that there are no external things and that all perception is false, while continuing to believe

in the truthfulness of introspection (a strange lack of consistency in the application of sceptical principles to knowledge), is solipsism. But no one can really believe that nothing exists but himself. He cannot believe it even in that secondary, intellectual way which is the way of a sincere philosophy—that is, be convinced of its truth, or seriously doubt the existence of other things than himself. Much less can he annul that primary belief which is betrayed by his behaving as if external things were real—indeed, to do this is wholly impossible. If it is impossible not to betray in everyday life the belief that things exist outside us, the notion of their possible non-existence ought not to be entertained by philosophers. Yet their non-existence is a necessary implication of every philosophy which asserts the complete identity of the real with the apparent.

16. *Doubt as to the Nature of the Real.*—Though tell-tale action obliges us to confess that something besides ourselves is real, the fallibility of perception makes it very possible to doubt whether the externally real in any way resembles the report of it given by perception. It is easy to feel this doubt even with regard to such general features of the apparent as space and time—as the example of Kant proves.

A circumstance which strengthens and, indeed, suggests this doubt is the peculiar nature of the mind. Mental activities such as perceiving, remembering, thinking, cannot be conceived as in space at all ; and the fact that we mentally transcend the present, and gaze across whole tracts of time, apprehending the

distant past and future, suggests a doubt whether the mind is even in time. Let us do justice to this doubt by admitting frankly that the mind, in this sense, is *not* in time. But that is because "mind" in this sense is a name for a sum of supersensible functions, functions exercised by the self, which latter *is* in time—and may even be in space.

The temptation to doubt whether space and time are real, and to base this doubt on the nature of the mind, will be removed when we have a really scientific psychology. It will then be evident that the mind, in the above sense, is not the same thing as the self. The difference of category between sense-data, which are essences, and states of the self, which are existents, will stand forth clearly. It will be found, I think, that these states are *spread out*, as they have to be in order that we should see, by means of them, a great number of things at once, or be able to turn our attention from one sort of bodily sensation to another; that even auditory sensations, tactile sensations, sensations of warmth and cold have a certain voluminousness which is due to their being spread out, and owe their apparent unity to the fact that, in being projected, they are also simplified, many of them at once being used to bring before us a single external event or state of our bodies. In short, introspection, instead of appearing to reveal an existent that cannot be in space, will confirm the testimony of perception that the real is spatial. For that the self is in time we are not likely to doubt.

Thus the self will resume its place as a part of the

natural world, from which it ought never to have wandered.

17. *Mind and Body*.—Only by giving free course to the animal faith that is natural to us can we regain the assurance that there is a real world in space and time, and that things are, in these two respects at least, very much as they appear to be. But when once we have made it our rule of thought to put faith in the deliverances of cognition so far as they do not contradict one another, certain relations disclose themselves between the self and its objects, perceptive and introspective, which prove, by such proof as is here possible, that in introspective knowledge the thing known may appear more nearly as it really is than in perceptive knowledge. To make this clear, I must first say a word about the relation between the self and the organism implied by our analysis.

Since perception, effected as it is by a process of sign-using, does not necessarily present its objects with entire correctness, and the real things, accordingly, may have different attributes or a different nature from those which appear, it is possible that the real thing which appears to us as the total nervous process (which *would* appear, that is, to an anatomist inspecting it thoroughly, during life) is the self. By assuming this identity we account for the union of mind and body, and make the self a part of the natural world. It puts an end to the dualism of the physical and the psychical, substituting for it a duality of the psychical and the form in which the psychical appears. The genesis of appearing and of the form

in which things appear has been fully accounted for by our theory, so that the psychical, or sentience, remains as the sole substance of things.

18. *The Truthfulness of Introspection.*—If, now, we put faith in perception not only when it tells us *that* things exist, but also when it tells us *what* they are, at least to the extent of believing that it correctly reveals their arrangement, we shall find such a disparity between the thing perceived and the nervous process by means of which it is perceived as must make us severely limit the informative power of perception. The outlines, indeed, of the external thing are correctly shown, because these can be transferred to the retina and the nervous process ; but, in ordinary perception, its enormous inner complexity is inevitably lost, and can only be discovered by the use of special instruments like the microscope or by reasoning from what is actually observed. This is a consequence of the fact that perception was evolved only to serve the needs of practice. What is more, we see and touch only the outsides of things, and tend therefore, as practical beings, to think of them as if they consisted of their outsides, or as if their inner being were only of the nature of force. Thus arises the conception of the purely physical as antithetical to the self not merely in its arrangement but in its intrinsic nature.

Sense-perception, in short, besides being very externally related to the real thing which is its object, is obliged to present this real thing by means of a state of the self so different from the real thing in its constitution, that the knowledge it affords is

necessarily largely symbolic. Perceptive knowledge of things is sufficiently truthful for the needs of practice : that is the utmost we can say.¹

Introspective knowledge, on the contrary, is presentation of a state of the self either by means of a later phase of the state, or by means of an image almost exactly resembling the state : so that the conditions for truthful and adequate presentation seem here to be fully realised. Even in introspection, however, the reaction or attitude—which is indispensable in order that anything should appear before the self at all—intervenes to modify the real state as presented and reduce it within the limits of our human power of apprehension, by simplifying it.

Such being the situation, it is evident that introspective knowing is as proper a field for the activity of the critic of knowledge as perception. The critic is a sort of judge. His duty is, after distinguishing the different aspects—existence, nature, attributes, qualities—which the introspected state presents, and taking due account of the processes, such as simplification and placing, by which the character of what appears is determined, to pronounce, with regard to each of these aspects in turn, whether it is to be considered as really characterising the thing.

(1) That the self *exists*, and exists at each moment in a particular state, there can be no doubt.

¹ Cf. Sir J. Larmor : " The senses can transmit to the mind only a very sketchy and entirely [?] symbolic picture of the external world " (" The Grasp of Mind on Nature ", in *Proc. Royal Society of Edinburgh*, vol. xlvii, part iii, p. 316).

(2) All introspective data reveal a certain fundamental nature, which we may call *feeling* or *sentience*. If data are brought into being by the use of our states as signs, these states will not lose their nature by being used as signs, or being simplified and projected, but the nature will still be obvious in the datum. It is obvious even in perceptive data—light, sound, odour, warmth and cold—and it is because they have this nature in them that they are given to the self, so that we say, “*I see, I hear*”, etc. Only a self consisting of sentience can use the word “*I*”. As projected, this sentience forms the apparent being of objects, and, when we perceive without introspecting, we overlook or ignore its nature as sentience: when we take account of this nature, we recognise that it is we who perceive. This nature, then, which is present in all data, and which perceptive data have in spite of their projection, must be the true nature of the self, the nature which makes it possible for anything to appear.

(3) Introspection also reveals two attributes, which there is every reason to regard as true attributes of the self. One of these is *intensity*—every introspected feeling is more or less intense; and if, as our theory holds, the correlated nerve-process is the same existent looked at from a more external point of view (that is, through the sense-organs of an anatomist), evidently perception and introspection here confirm each other. The other attribute is that spread-outness or *extensity* which we have seen reason to believe a characteristic of all feelings; and here again, it is evident that an

existent which can appear in the form of a nerve-process must needs be spread out.

(4) The untruthful elements of introspective data are particular *qualities*, which, as we have seen, are products of simplification ; and, in the case of visual and auditory sensations, *externality* and definite *magnitude*. When, for example, the expanse of the sky appears to be external to us, and to have a magnitude inconsistent with its being within the body, these features of the apparent are due to projection.

To sum up : the situation in introspective awareness is such as to justify the belief that, in the respects mentioned, we have cognised this small portion of the real truly ; indeed, with a fullness of truth not possible to us in the case of external things. On the other hand, we have found in this portion of the real attributes—intensity and extensity—which make it appear to be indeed a part of Nature : for what is intensity but that which physicists call energy, and what is extensity but space ? Thus our analysis has succeeded in reducing all that is real to a single system ; the relation of the nervous process to the rest of the physical world has furnished the key to the relation of the self to the rest of the real.

19. *Awareness not a Datum of Experience.*—This view of the self justifies our sharp distinction between *awareness* and *sentience* : the former being the function by which things are present to us (awareness is always of something, it is a bi-polar relation between the self and what is present to it), and sentience that nature

in the self which makes the presence of things to it possible.

This account of the matter cannot fairly be controverted without offering some alternative theory of awareness. Neo-realists, I think, have not worked out with sufficient explicitness their theory of awareness. It is their duty to explain clearly, if they can, what awareness is, and how our knowledge of it is obtained.

The traditional theory that it is a mysterious faculty of contemplation, difficult to observe at the moment of our being aware—"diaphanous"—yet still perceptible, rests on an error of observation. No psychologist ever looked for "consciousness" in this sense with a more keenly observant eye than William James; but, after years of search and reflection, he came to the conclusion that it is "the last faint rumour left by the Soul on the upper air of thought". Though he failed to explain what awareness is, he proved, I think, convincingly that it is not a possible datum of experience. Let us consider briefly why this is so.

At the moment when anything appears, we are aware solely of *what* appears, not of its appearing. Awareness is not given at the moment when we are aware. Not being given at that moment, it cannot become given at any later moment, through memory or retrospection or introspection. Introspection discloses something quite different, namely, sentience. The reason why awareness can never be given in experience is because it is a functional relation between

the self and what appears ; which last fills the entire field of view, to the exclusion of the relation or function by which it appears. It is the same as the reason why (simply in a physical sense) a man can never see himself see.

Now with this evident truth our theory of the self and of awareness is in perfect accord. All other theories of awareness, it seems to me, either reduce it to a purely physical relation or suppress it altogether. But awareness—being a transcending of space or time or both by our own life—is essentially non-physical in its nature ; and to suppress it, or to absorb it into what appears, so that the latter does not appear *to* some one, is absurd. Only the theory above offered, it seems to me, satisfactorily unites the transcending and the life.

20. *The Futility of Agnosticism.*—The notion of an observable “consciousness” was one stumbling-block in the way of a gnostic theory of knowledge ; another is the denial that introspection reveals the spatiality of the self. Nature is thought to be so mysterious, and to have so cunningly devised the functions of vision, hearing, and touch with which she has provided us, that any assumption that things really are as our senses reveal them to be—even in respect of space and time—is illicit. We may only assume that it is necessary to *think* of them as in space and time ; and, above all, wise to behave as if they were in space and time. But to think that our thoughts of Nature are true is forbidden us. Thus the dear creature has effectually pulled the wool over our eyes.

This, I confess, seems to me gratuitous doubt. Moreover, it counts without introspection. Such a view is defensible only on the basis of that one of the two psychological space-theories which is called "empiricist"; the space-theory underlying our own view is, of course, the "nativist". The question here, though complicated by epistemological difficulties, is one of fact, to be decided by observation: are sensations, in our sense, extended, or are they not? I need not repeat my own view.

If traces of extensity are to be found in all sensations, and if introspective knowing takes place in the way above described—that is, by using a state as a sign of its earlier self—it follows that introspection of visual sensations, and consequently perception through visual sense-data, gives us an authentic view, a view amounting to infallible intuition, of the nature of space-relations as they exist in the externally real. Doubtless, in perception, these relations are "contracted" by the process we have called simplification, but that need not obscure their nature. Doubtless, again, the space-relations in our sensations, as given to introspection, are still more contracted and covered up by the same process—just as time appears in a simplified and shortened form in our awareness of the "specious present". But, in being simplified, neither space nor time is altered in its essential nature; and by means of a little analysis and discrimination we can discern the real beneath (or rather *in*) the apparent.

Why should we imagine real space and time to be

wholly unlike space and time as they appear to us? Must not real space, in any case, be tridimensional, and time perpetually moving? If any reader thinks that the real is not in space and time at all, I cannot argue with him; I think he must be using the word "real" in a different sense from that in which I use it.

One last objection to this gnostic theory of knowledge deserves a word. It may be urged that the human faculty of knowing has come into existence in so haphazard a way that our confidence in its validity is hardly justified; that for a being patched together out of clods and humours to assume that he knows things as they really are savours of presumption. This is an argument of an empirical kind, and based on the theory of evolution. But this argument may easily be turned about in the opposite sense, and made to justify gnosticism. For, according to our theory, it is precisely because we—that is, our selves—are integral parts of Nature, and made of none but natural materials, and because the operations connecting us with the other parts of Nature are conducted in a thoroughly natural manner, that we have reason to regard our confidence in knowing as justified. Nature would have difficulty in hiding from beings who are parts of herself. If we doubt the possibility of knowledge, it is we who have pulled the wool over our own eyes.

IV

THE CONTINUITY OF SPACE AND TIME

THE question I wish to discuss in this essay is how we ought to conceive the relation between points of space and extension, between instants of time and duration. There is, if I am not mistaken, a fallacy into which we are liable to fall in considering this matter ; it leads to a dilemma, both horns of which are equally unsatisfactory ; and when we avoid this fallacy, the right conception of the relation becomes clear.

I shall take for granted, in the following argument, that finite lengths of space and finite intervals of time really are infinitely divisible, as is commonly assumed.

By a point I mean of course a position without extension, by an instant a *now* without duration. It is not necessary, I think, to begin by asking how we come by these conceptions. We certainly possess them, and assume that in some sense they are applicable to Nature. Prof. Whitehead's method of "extensive abstraction" presents itself as a way in which we may have come by them. Certainly we see, as soon as we have learned to discriminate, areas within areas, of increasing smallness. I shall be in a

better position to explain how far I can accept Prof. Whitehead's doctrine when I have indicated what I take to be the fallacy.

Avoidance of this fallacy, should the reader agree with me that it is one, will be the thread enabling us to find our way through what Leibniz called "the labyrinth of the continuum". I should feel less confidence that this is the true thread if it did not appear to be that followed by Leibniz himself.

I

The Dilemma

The view usually taken is that points and instants are *mere boundaries*. Let us consider the consequences of this view; and let us start from the successive divisions and subdivisions of a line.

We are apt to reason in the following way. Before we begin to divide a line, all the extension lies between the end-points; and as we proceed to insert points, the extension still falls outside and lies between them; and this is true *ad infinitum*. Furthermore we do not really *insert* the points; we find them, as definite positions in the line—the line is not simply divisible, but already divided, by the positions which are in it. Now it cannot be supposed that by increasing the number of the points to infinity the extension is made to be within them. The points and the extensions must, to the end, remain mutually external. Consequently the infinite dividedness of the line signifies that it is composed of an infinite number of in-
fini-

tesimal extensions, with an infinite number of points one of which separates each adjacent two of them.

The same conclusion seems to follow if we consider the nature of a point. A point is, by definition, unextended. When we imagine that, if there were an infinite number of them, they might fill out a line or melt together into a continuum, we are inadvertently endowing them (so we say to ourselves) with some degree, however slight, of extension. But this contradicts the nature of a point. Hence an extension cannot be composed of points, but only of an infinite number of infinitesimal extensions.

But each of these must be bounded by points. Thus it is not a question of infinitesimal extensions *or* points, but both are equally necessary to form the continuum.

Before attempting to criticise this reasoning, let us make the parallel reasoning in regard to time.

Change is in its essence a passage from one state of being to another state, and these states cannot be simultaneous ; every such passage occupies an interval of time, the limits of which are instants. If, for example, a body moves from one position to another, it must have been in the first position for at least an instant, and for at least an instant in the last ; and if it has moved a finite distance, it must have been occupied for a finite interval of time in doing so. During this time it must have passed through all the intervening positions, and, if it was moving, it can have been in each of these positions only for an instant. Thus an interval of time is not only divisible but

divided by an infinite number of instants. But these instants are without duration—if they had duration they would not be instants. Hence all the duration falls *between* the instants, and is divided by them (since they are infinite in number) into an infinite number of infinitesimal durations, corresponding to the infinite number of infinitesimal extensions through which the body must move.

What will doubtless appear to many readers to be the error in this reasoning is that it introduces infinitesimals. They will accept the necessary distinctness of points and extensions, of instants and durations, but deny that there can be any extensions or durations which are at once infinitesimal and real. Without examining for the moment whether this criticism is justified, let us raise the question, in which of these two aspects of space and time what is real or existent may be said to be contained.

And, first, let us ask this question with respect to space. If the real were lodged solely in the points, and not in the infinitesimal extensions that separate them, these extensions would fall outside it and reality in its proper nature would not be extended. An infinite number of punctiform reals (so we reason) would be no more extended than a single one. But in experience, from which we derive our idea of the real, it is found to be extended. Consequently we must decide for the extensions and not for the points. The real could not, however, be extended unless it consisted of separate parts ; of separate parts, indeed,

ad infinitum, as we have seen ; and its constituents must therefore be in the infinitesimal extensions, of which the points are merely the boundaries. Thus, spatially considered, the real apparently consists of an infinite number of infinitesimally extended parts. So far, apart from the question of infinitesimals, no obvious error appears in the argument.

If what is real lies in the infinitesimal extensions, it seems to follow that, in the case of time, it must lie, not in the instants, but in the infinitesimal durations. An instant, it might be said, is no time at all ; it is a mere boundary between the past and the future. Unless a thing endures, for at least an infinitesimal length of time, it cannot be said to exist.

The difficulty of this is that it makes the present—that “mere boundary between the past and the future”—unreal. Perhaps it will be replied that the real present is not an instant but an infinitesimal duration. In that case, the present would be separated by an instant, a mere boundary, from the past, and by another instant from the future. Now time is originally real only in the form of present time ; past time meaning time that once *was* present, and future time, time that *will be* present. We may call this the primary reality of the present. The primary reality of the present, it may be said, would be equally well secured by making it an instant or by making it an infinitesimal duration : for in either case only one such would be real at a time, and all earlier ones would be past and all later ones future.

Moreover, this view seems to solve the difficulty

before mentioned, that, if what is real lies in the instants, duration necessarily falls outside it, so that the real cannot be said to endure. Prof. Whitehead has made much of this difficulty,¹ urging that the conception of time as composed of successive instants, and of Nature as existing in only one of them at a time, allows no place for "velocity, kinetic energy, acceleration, force, and mass", which have to be added as "an appendix to the book of Nature". An instant, he says, is "only a complex abstract conception which is useful for the simple expression of certain natural relations".

Unquestionably, whoever maintains that the real exists only in instants, and in only one instant at a time, is under obligation to indicate some form in which velocity, acceleration, and the rest can be contained in the instant.

But the difficulty of identifying the present with any duration, however short—even though it were but infinitesimal—is that *every duration consists of parts, which do not exist at once*. There can be no duration that does not contain a before and an after, a series of earlier and later parts; indeed, in any finite duration at least, the number of the successive parts must be infinite. But, in that case, *each* of these parts is a present, and the whole which they form, not existing at once, cannot be a present. The present, it is quite clear, can only be an instant.

But, if so, it is in the instant primarily, and only

¹ Symposium on "Time, Space, and Material", in *Arist. Soc. Proceedings*, supplementary vol. ii, pp. 44-46.

secondarily and by consequence in the durations, that the real must be contained.

The dilemma is, then, that if we conceive the durations and the instants as mutually external, and the latter as merely bounding the former, we are forced either to lodge the real in the instants, and so deprive it of the benefit of enduring, or to lodge it in the durations, and so deprive it of the power of ever being a present.

II

The Fallacy

I must beg the reader's indulgence if, in what follows, I make statements which appear to him to be in contradiction with established truths. I ask him to suspend his judgement until I have had time to put my view fully before him.

The nature of continuity has usually been discussed with special reference to space, and the application then made (if made at all) to time. But there are advantages in considering the continuity of time first.

My view rests on the following three points :

1. The present, since it alone is ever real, is *not a mere boundary*. It is not extended temporally (*i.e.*, it does not endure), but neither is it empty. It is one of the constituent parts of time.

2. The present cannot of course be two (or more) instants, but only one. But since, at that instant, all earlier instants are past and no longer real, and all

later instants are future and not yet real, the present instant must be *distinct* from all other instants.

3. And, since the instants come in single file, and some future instants are farther away from and others nearer to the present, there must be one future instant which is nearest to the present, or *next* to it.

If the distinctness of the instants and the fact that they are arranged in order be considered together, the inevitableness of this relation of nextness appears clearly.

The prejudice, which leads us to conclude that two instants cannot be next to each other, is due wholly to the false notion that the present instant—for instants never are, except when they are present—is a mere boundary. A boundary must bound (on each side) something different from itself; if two boundaries were next to each other, they would (on one side) bound nothing—that is, delimit the parts of something other than themselves—and therefore they would fuse and become one. But to two instants, which are distinct in their reality (*i.e.* which contain distinct states of the real), this reasoning does not apply.

It is therefore perfectly possible for two instants to be next to each other, provided they are distinct from each other and contain immediately successive states of the real.

One further observation must be made, in order that we may have in hand all the materials for a theory of temporal continuity.

4. Instants which are next to each other may be said to be *joined*, and I shall call the connexion which

binds them together a *junction*. But instants which are not next to each other—being separated from each other by any number of intervening instants—are *disjoined*, and there is *no* immediate connexion between them. Disjunction is as important to the conception of continuity as junction. It will be found, I think, to be closely connected with the now generally admitted non-existence of action at a distance.

The above four points, (1) the reality of the instants, (2) their distinctness from one another, (3) the nextness of any two immediately successive instants, that is, the junction between them, (4) the disjunction from one another of all instants that are not immediately successive, seem to me, when taken together, to form a complete analysis of temporal continuity.

What it means, to be sure, for two instants to be next to each other—how they can be distinct, and yet joined, in the way which we call temporal sequence—still remains to be explained. I think it cannot be explained without passing away from mere time, and considering the real things that are in time. Before attempting to do this, we had better turn from time to space, and ask how far our analysis can be made to explain the relation between points and extension. But I may say now that, in my opinion, temporal sequence depends on the fact that the real of one instant *brings forth* the real of the next.

I will now draw up an argument in regard to space parallel to that which I have used in the case of time.

1. If a line intersects another, they have one, and only one, point in common. Therefore this point is *distinct* from all the other points in the line.

2. If one point in a line is distinct from the others, then every point in the line must be distinct from every other. And if the points are arranged in order, so that some points are farther away from and others nearer to the point of intersection, there must (if the points are distinct) be one point on each side which is nearest to this point, or *next* to it.

3. This is possible, to be sure, only on the assumption that points—like instants—are not mere boundaries, but constituents of the line, and the *loci* of reals. But if what is real may and must exist in instants, despite the absence in them of temporal extension, why is it not conceivable that, in the case of space, what is real exists in points? Why may not space be actually composed of points, distinct from but next to one another?

4. Of course, only a certain number (perhaps infinite) of points are next to and spatially joined with a given point, and all other points are disjoined from it and connected with it only through the medium of the intervening points. And this, again, is in strict accord with the principle of the non-existence of action at a distance.

Thus (1) the reality of points, (2) their distinctness from one another, (3) the nextness of a point to certain others, that is, the existence of junctions between them, and (4) the disjunction of the point from all other points, seem to afford an analysis of spatial

continuity as defensible as the analysis which we have previously made of time.

A word must now be said as to the right way of conceiving junctions. *It is important not to conceive them as between the points in a spatial sense.* To do so is to fall into the fallacy which I am engaged in explaining. If two points are next to each other, *there is no place between them*; if there were, each of the points would be next to the place, but they would not be next to each other. Thus it is impossible to draw a line between two adjacent points: the line must pass either through one point or through the other. The points are, indeed, distinct—they are really two, not one—but there is no gap of any sort between them.

Hence a junction is a bond that includes, not a boundary that separates. It is between the points only in the sense in which friendship is between friends. In other words, it is not a thing on the same plane with the elements that it unites. Mr. Russell has, I think, expressed the right view when he says that a relation is an entity of a different “type” from the things which it relates.¹

In what sense, then, is division of a line possible? Since a junction is not a place, there is no *place* where a line can be divided except a point. Ordinarily, in dividing a line, we choose some point, and consider as wholes first what lies on one side of the point and then what lies on the other. But this is not true

¹ *Contemporary British Philosophy*, vol. i, p. 369.

division, since the point is common to the two parts. True division must come at a junction, and consist in distinguishing the part of the line up to a certain point, and the part from the next point onward.

It is evident that such division—by our attending successively to smaller and smaller parts—would conduct ultimately to points ; though, if a line of finite length is infinitely divisible, an infinite number of divisions would be necessary in order to reach them. The smallest possible bit of extension would consist of two adjacent points. In the division of these from each other, extension would disappear.

But observe now that extension has been in process of disappearing from the very outset. When we made our first division of the line at a junction, we did so by ignoring and annihilating in thought, or at least withdrawing our attention from, that junction—which yet was essential to the continuity of the line ; and with each successive division we have continued to do so, until at last only the points are left, with no junctions between them. Division and subdivision are thus a progressive process of abstracting from extension ; and (since this process is only one of abstracting, and the junctions still remain in spite of our inattention to them) we may see in this a justification of Bergson's view—propounded, indeed, only with respect to time, but applicable surely to space—that the continuous is, in one sense, indivisible : namely, in the sense that its parts are not separable from each other without destroying the real continuity.

The idea that points—which seem, and in one sense

are, mere zeros—may by their collocation constitute extension, is at first a strange and hardly conceivable one. But close consideration, I think, lightens the difficulty. If two points placed next to each other are larger than one, though it be but infinitesimally, a sufficient number of points next each to each may produce a more considerable largeness. If only a finite number of points are thus arranged, the product will be a line of infinitesimal length; if an infinite number, a line of finite length. This takes for granted, it is true, that the line of finite length really is infinitely divisible.

If there are no places between the points, this means that they completely fill out the line and make it continuous. In the same way, points may completely fill out a surface, leaving no empty area anywhere; they may completely fill out a volume.

We can now see where the fallacy lay in the reasoning which appeared to prove that, if what is real is contained in the points, extension must fall outside it.

Extension does not fall outside the real, because you must have two points which are next to each other—in other words, have *nothing* between them—in order to have even the smallest extension. A single point is not extended, but two points which are next to each other form an extension.

The fallacy lay in mistakenly conceiving the infinitesimal extensions as between the points spatially, whereas there is nothing between them. If there were something between them, either matter or space

or anything whatever, each point would be next to *it*, but they would not be next to each other. "Between" was understood in a spatial, though it was true only in a metaphorical sense—as when we say that two men, between them, may accomplish something. Only through this misunderstanding did all the extension appear to fall outside the points. In reality, the infinitesimal extension is not between the points, but *includes* or is composed of them.

Now let us apply the same analysis to time. Since I have admitted that points, though divisible from one another in the sense of distinguishable (for they are distinct), are not divisible in the sense of separate (for they are joined, and occur only as points in space), I shall not be unduly "spatialising" time if I maintain that it can be treated in an analogous way, and conceived as consisting of instants. There is really no difference between the case of space and that of time, except that the elements of the latter, being instants, are successive, which means that only one of them is real at once.

This peculiarity of time has the consequence that any instant or interval, looked at from the point of view of another instant or interval, is either past or future—*i.e.* only *was* or *will be* real—so that its reality is secondary to and derived from the reality of a present instant. Thus pastness and futurity are not inherent: they are expressive of a point of view. Every instant, when alone it is real, is a present. Time is real only as a series of presents.

We have therefore only to consider this series of presents.

Here the special difficulty attaching to the case of time begins to emerge. In the case of space, the two points forming a minimal extension exist at once; and it is therefore easy to understand their being next to each other. For the nextness is in the same instant of time as the points. Since two instants are not in the same time, and the junction between them cannot be either in the first instant or in the second, it seems at first sight as though it could not be at all.

But this is to demand that time itself should be in time—that succession, which is essentially a relation between two instants, should be in one of the instants that succeed each other. Evidently we must not ask that time should be in itself: and if our argument has shown that it is possible, in the abstract, for one thing to be next to another, we must be prepared to admit that, in the case of time, this nextness may assume the concrete form of *sequence*, since that is the only possible way of providing for time's existence.

We learn the existence of time, of course, through primary memory, as we learn the existence of space through perception; and no one can doubt that temporal sequence is indeed a fact.

This granted, we have only to follow closely the analogy of the relation of points to extension in the case of space. We there found that the extensions do not lie outside the points, but include them, each smallest extension consisting of two adjacent points. In the same way, a duration does not lie outside of,

and externally connect, two sequent presents, but consists of them in their immediate sequence. Thus joined, the two presents form an infinitesimal duration ; an infinite number of infinitesimal durations—or (to analyse to the end) of instants with temporal junctions between them—form a finite interval of time ; and finite intervals, similarly joined (and they cannot possibly be disjointed, except in thought), form all time.

What is there, on this theory, between two successive instants? *Nothing!* Not an interval of time, for both of them are necessary to form the smallest interval of time. Not an instant, for, if there were an instant between them, they would not be next to each other. There is nothing between them except their distinctness and temporal nextness : and these are between them only in the sense in which friendship is between friends, or (to use a closer analogy) the filial relation is between father and son. Then, in the literal sense of “between”, there is nothing at all between them. One flows into the other ; or, if we consider a long sequence, they flow in a smooth and continuous stream—a stream made smooth by the very fact that they are durationless instants. And they do so as much because of as despite their distinctness.

This absence of intervening elements removes the last difficulty, and makes it clear that Leibniz was not wrong in saying that space and time are essentially numbers of points and numbers of instants, arranged in their respective ways.

III

The Reality of Points and Instants

The one argument for this analysis which I have thus far offered is the nature of the present. I believe this argument to be conclusive ; but, as there is danger of its force being missed through a certain confusion, I will first refer to this source of possible misapprehension, and then restate the argument.

It is important, in considering the matter, that we should not confuse our minds by attributing to the real present characters which belong only to the "specious present". It is true that our knowledge of time is derived ultimately from the specious present. But this present *is* specious : it is time as it appears to our minds, not time as it really elapses. Being always a short duration, it may show us at once events which did not occur at once—as when we perceive simultaneously two successive ticks of a clock. We are able to do this, because the first tick is remembered (by means of primary memory) at the moment when the second tick is actually heard. It would evidently be a misreading of experience if we were to attribute to real time a simultaneity which is true only of our awareness of time. Because experienced time is a duration, it does not follow that there can be no times which are not durations, or that durations may not themselves be composed of instants. I will now restate the argument.

The idea of duration is the idea of *passage*, from

one present to another or through a series of presents. It therefore implies a plurality of presents. These presents are successive: that is, no two of them are real at once. The argument hinges on the fact that each present is real separately. By this I do not mean that one present does not somehow involve another as a consequence (how, we shall have later to consider), but that it is distinct in its reality from that other. Reality thus belongs to the presents entering into a duration, *severally*—not collectively to the whole duration which they form. There is no time at which a duration as a whole is real: there are only times when its constituent presents are real. But there cannot be many presents, which are real separately from each other or severally, unless there are single presents, each of which is real by itself (this is the well-known reasoning of Leibniz). Since, then, every duration involves a plurality of presents, the single present cannot be a duration (either finite or infinitesimal), but can only be an instant.

Duration, in other words, is in its essence relational. It is like change, which is not thinkable except as a passage from one state of being to another. To say that time consists exclusively of durations, or that the real consists of changes without states, is to assert relations without terms.

The argument from the nature of the present is especially convincing, because no two instants are real at once, and it is therefore easy to make the severalness of their reality felt. Evidently there must be a time which is real at once (if I may use

“at once”, not in the sense of simultaneity, but of *at one stroke*, or *by itself*). But I think a precisely similar argument might be constructed in regard to the point. It would run as follows.

Every extension is a plurality of wheres, which (in so far as they are occupied—for I am not asserting empty or absolute space) are real severally and not collectively. Since every extension is a collection of wheres, and reality never belongs to the collection as such, the where which is ultimately real, the single place, must be a point. That is to say, if the real world is extended, it can only be because its elements reside in points.

How do we arrive at the knowledge of points and instants, if, as must be admitted, they are quite beyond the range of possible experience? We do so by following out in thought the logical implications of what is experienced. One way in which we may do this has already been suggested. Areas are seen lying within areas, in relations of ever-repeated inclusion, and, when once we have recognised that this extends far below the limits of human vision, no reason appears why the inclusion should not continue indefinitely; indeed, its indefinite continuance seems necessary as the ground of the continuity characterising the data of experience. Thus the mind is launched upon a progress to which there is no limit but the point. Similarly, intervals of time are contained within intervals, in a way that ultimately implies the instant.

But why, if the progress is endless, has it not strictly

no limit ? Because—in the case of time—there could then be no single present. Time would consist exclusively of durations, that is, of parts every one of which contains a before and an after, without ever a part which is not thus composite, a part which is real at once. It is as if we should say that the real consists entirely of twos, without any real ones. To conceive time so is to think of two parts of it together, which cannot exist together; and this is to “spatialise” time—to view it as it appears to retrospective or prospective thought, in the form of a line the parts of which exist simultaneously, and not as it really elapses, successively. It is to fail to recognise the infinite successiveness of time, the presence of succession in *every* duration.

The way of arriving at points and instants referred to above has been used by some contemporary philosophers as a means of avoiding the conclusion that points and instants are real. To Prof. Whitehead and those who agree with him it seems doubtful whether real points and instants can be legitimately inferred from the data of experience; and he offers his sets of abstractive series, all the members of which are extensions and durations, as a logically satisfactory substitute for them. There is at first sight something modest and (quite literally) unassuming about this view, which impresses favourably; it seems to represent a judicious scepticism, loth to assert entities for which experience furnishes no unequivocal warrant. Two questions must here be distinguished: (1) whether this method, as a way of

passing from experienced data to points and instants, is faultless logically ; (2) whether points and instants are real—that is, actual constituents of space and time—or only ideal. As to the former question I hesitate to express an opinion, being aware of my incompetence in all matters relating to mathematics and mathematical logic ; but I may allow myself to ask a couple of questions which have occurred to me in reflecting on the abstractive method.

(1) One thing cannot enclose another unless the enclosed thing, at least, has *ends*. Can we be sure of the fact of enclosure without knowing exactly where these ends are ? I suppose we can : for we may perceive one of the things as extending into a place where the other is not perceived—as when we see a man in the street. Yet the ends must be somewhere ; and, moreover, they must be really ends. How then do the advocates of this method conceive them ? Can the end of a volume be anything but a surface, the end of a surface anything but a line, and the end of a line anything but a point ? If there is an alternative to this view, what is it ? And if there is no alternative, are not surfaces, lines, and points already implied in the assumption of volumes that can enclose and be enclosed ?

(2) In order that volumes may be so arranged as to converge, not to *some* point, but to a *particular* point—and, unless they do so, we shall not be able to infer that the resulting points are arranged in the form of a continuous line—they must be in exact relations to one another. Is this possible, or can

such exact relations be conceived, unless—I do not say, we know just where their ends are—but unless we conceive them as having exactly placed ends, which, to be exactly placed, must needs be surfaces ? Or can surfaces enclose one another in such a way as to lead to particular lines, unless we conceive them as having exactly placed ends, which, to be such, must be lines ? Or can lines lead by convergence, not to some point, but to a particular point, unless they have exactly placed ends, which are points ? Can we, in fine, arrive at points, lines, and surfaces by this method unless we presuppose them ?

Doubtless the advocates of the abstractive method have answers to these questions which seem to them satisfactory, but I do not know what the answers are.

Even supposing this method, however, to be logically flawless, it would not follow that points and instants are not real. If it be true that time is real only as a present, and that the present does not last—in a word, that time is fleeting, not enduring—instants, at least, must be real ; and the analogous proposition may be true of space. In that case the abstractive method cannot be looked upon as providing a substitute for real points and instants, but at most as a way of arriving at them. The limits to which series of extensions and durations converge must be as real as the extensions and durations themselves. But how can an endless series have a real limit ? Is not this a contradiction ?

No, for the case may be like that of Achilles, who must successively traverse $\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$. . . of the distance

in order to reach the tortoise, but is not prevented from doing so by the fact that this series is endless.

But this, it will be replied, is to assert the reality of infinitesimals. To which I can only answer, that if extension is in fact infinitely divisible, and if, further, whatever is divisible is already in itself divided (as we saw at the outset), infinitesimals must be as real as the finite extensions which are the starting-point of division.¹

Another argument for the reality of infinitesimals is the fact that the hypotenuse of a right-angled triangle, whose sides are unity, is measured by $\sqrt{2}$

¹ I am encouraged to take this view by the following passage of Charles Peirce (*Chance, Love and Logic*, p. 208), who was no mean logician: "Most of the mathematicians who during the last two generations have treated the differential calculus have been of the opinion that an infinitesimal quantity is an absurdity; although, with their habitual caution, they have often added 'or, at any rate, the conception of an infinitesimal is so difficult, that we practically cannot reason about it with confidence and security'. Accordingly, the doctrine of limits has been invented to evade the difficulty, or, as some say, to explain the signification of the word 'infinitesimal'. This doctrine, in one form or another, is taught in all the text-books, though in some of them only as an alternative view of the matter; it answers well enough for the purposes of calculation, though even in that application it has its difficulties. The illumination of the subject by a strict notation for the logic of relatives had shown me clearly and evidently that the idea of an infinitesimal involves no contradiction, before I became acquainted with the writings of Dr. Georg Cantor . . . in which the same view is defended with extraordinary genius and penetrating logic." And again (p. 218): "Every number whose expression in decimals requires but a finite number of places of decimals is commensurable. Therefore, incommensurable numbers suppose an infinitieth place of decimals. The word infinitesimal is simply the Latin form of infinitieth; that is, it is an ordinal formed from *infinitum*, as centesimal from *centum*. Thus continuity supposes infinitesimal quantities. There is nothing contradictory about the idea of such quantities."

I notice also with satisfaction that Prof. Montague (in *The Ways of Knowing*, p. 180) does not hesitate to speak of "infinitieths" of a mile, "infinitieths" of an hour.

—and yet is real ; and that the circumference of a circle, though as real as the diameter, is measured by π .

Finally, consider what follows if, while declining to admit infinitesimals, we deny that there is any real present except a duration. No reason then exists—since every one of the indefinitely numerous durations, which alone are deemed real, is finite in length—for preferring one duration to another as the present : and we thus lose the power of drawing a clear line of demarcation between the present and the past. It then follows that *all* duration (all, at least, that has actually elapsed) is equally real ; and that the past, therefore, still exists just as truly as the present. In order, none the less, to have some distinction between the past and the present, it will be suggested that the past, although still existent, is no longer active. I find it difficult to take this suggestion seriously.¹ That the aeons of past time—say, before the first beginning of the solar system—still exist in any other way than as a possible object of thought, is an idea so extravagant that no philosopher could ever have propounded it if he had not been arguing logically (as is so frequently the habit of philosophers) from a false premiss.

How comes this doctrine of the unreality of points and instants to be held ? It is important that, if possible, we should trace it to its source. Its motive, let us admit, is a reasonable empiricism—the effort

¹ Imagine a lady, whose charms have suffered *du temps l'irréparable outrage*, consoled by a philosopher with the assurance that her beauty is as real as ever it was, only no longer active !

to keep strictly to the data of experience, from which alone the conception of points and instants can be derived. Its source, if I am not mistaken, is the phenomenalist theory of perception. It follows from this theory that the real is of the nature of the sense-datum ; that that wholeness which characterises the sense-datum is also a characteristic of the real ; and that points and instants, since they are not actual elements in sense-data, cannot be real. They can only be ideal limits, introduced by the mind—mental constructs formed out of sense-data. This view leaves the fact that points and instants are logically implied in sense-data, in so far as these have continuity, unexplained. On our theory, the apparent or “ private ” space and time of sense-data arise by a simplification of real or “ public ” space and time ; and it is natural that the simplification should cover up the points and instants. Phenomenalism is the prevailing fallacy of contemporary thought, and it is not wonderful that it should have infected even mathematicians and physicists. It seems to me possible (though I acknowledge my incompetence here) that Weierstrass’s disproof of infinitesimals was arrived at under the influence of similar phenomenalist notions, which were in the air in Germany.

IV

The Physical Basis of Junctions

I must now attempt—with the diffidence proper to a non-physicist and non-mathematician—to indicate

a form in which motion, with its characters of velocity and acceleration, may be contained in the present instant. Motion evidently cannot be contained there as such. But it is not inconceivable that something may be there contained which unambiguously prescribes the change of place, on the part of matter or of energy, which must occur from that instant to the next.

But is it sufficient that what is real at present should *prescribe* what shall be real a moment hence? No, it is not sufficient, as I hope soon to make clear.

All physical change is motion, and physics is exclusively occupied in describing motions, without concerning itself with (or being, I think, able to answer) the question what it is that moves. This real something is known to physics only as the source of action—that is, as producing or tending to produce changes of place of its own parts—and, as such, is called *energy*. If space is composed of points and the real resides in them, the sources of action cannot be less numerous than the points. And if the real exists only in present instants, these infinitely numerous energies must, at the instant, be only potential.

Further, matter is now recognised to be only a form—perhaps a temporary form—in which the energies are arranged: contemporary physics has substituted the conception of energy, as the ultimate physical reality, for that of matter. An essential difference between the two conceptions is that, whereas pieces of matter were impenetrable to each other, portions of energy are not so. The amount

of energy or *tension* accumulated in a point may vary from place to place.

If, then, I am not misconceiving the fundamental notions of contemporary physics, the form in which motion, with velocity and acceleration, may be contained in the present instant is that of a varying distribution of the quantity of energy in points. The physical world is a sea of energy, with waves rising in different places to considerable heights, and with extensive areas in which the energy is at a relatively even level ; these differences of level or height being in a fourth dimension, additional to the three dimensions of space, and existing in the instant. The ultimate explanation of physical occurrences would be furnished by some form of wave theory.

If this is correct, those who speak of the constituents of physical reality as “ events ”, and those who say that time is essentially “ duration ”, are right as far as they go, but they do not carry the analysis down to the ultimate constituents.

The “ passage ”, the “ *élan* ”, however, which they recognise, is a further fact, without which our own analysis would be fatally incomplete. I suggested above that it is not sufficient for the present real merely to *prescribe* what the next present real shall be : what is further requisite ? That it should carry its prescription into effect.

If the real exists only in one instant at a time, and the entire sum of it is contained in that instant, either the new instant, when it comes, is—not a distinct existent, for that it unquestionably is—but an existent

unconnected with the old ; or else the old instant, the real that was in that instant, has had a hand in producing the new instant of the real.

I am anxious to state my meaning here in the barest possible way, so that metaphors may not be taken for a description of literal fact, and so that I may not be accused of asserting more than the facts warrant. *It is of the nature of the real to continue in being. The real is of such a nature as to prolong its being from instant to instant. It is self-perpetuating.*

The important point is that this continuance is involved in the nature of the real as it is at each instant—that the new real does not, so to speak, arrive from some other quarter, or merely supervene. One instant of the real does not *logically imply* the next : but it *naturally involves* the next. In other words, the new instant of the real was present in the old instant as a *potentiality*, and the coming of the new instant is the actualising of this potentiality.

Now that I have stated the bare literal fact, I may mention a number of pardonable metaphors : the old instant of the real “ leads to ”, “ brings forth ”, “ gives birth to ” the new instant of the real, for such is its nature.

Mere continuance, with or without change, is the most abstract statement of what occurs. When we take special note of change, and of the agency of the last instant of the real in producing it, the relation in question assumes the more concrete form of *cause and effect*. The real now appears as *power* or *force*.

This, of course, brings us into conflict with Hume's

denial of the reality of causation, or production, or generation. Hume was probably right in denying that the cause *logically implies* the effect. No inspection of the cause can discover the effect in it. He was wrong, I think, in denying that the cause *naturally involves* the effect, and can be recognised in experience as doing so. Only on this assumption have we a basis for induction—for which adherents of the Humian theory look in vain among their principles. And only on this assumption can we account naturally for the transcendent reference of states of the self, in expectation and other forms of awareness.¹

Hume's denial of the reality of causation seems to me no more valid than his denial of substance—that is, of a real thing appearing to us in perception, and not wholly identifiable with the apparent as such; and the two denials have their root in the same phenomenalistic fallacy, which supposes that in perception the real is given to mere sense, and not to a sensibly mediated intent. Hume could not know, in the state in which psychology then was, that we cannot perceive unless we react, and so indicate the object with which our cognition has to do. But to react is to exert power, and to encounter a power in the object which is the counterpart of our own; the notion of power being one which we derive primarily from our introspective observation of ourselves, and attribute secondarily to the thing which resists us. This doctrine is of course as old as the hills, but current

¹ Prof. Montague has recognised this in his thesis that "consciousness", or, as I should say, sentience, is identical with potential energy.

philosophy seems to have lost sight of its solid basis. Leibniz was wiser when he said : *La force, dites-vous, nous ne la connaissons que par ses effets et non telle qu'elle est en soi. Je réponds qu'il en serait ainsi si nous n'avions pas une âme [a self] et si nous ne la connaissions pas ; mais notre âme connue de nous a des perceptions et des appétits [sensations and impulses], et sa nature y est contenue.* One need not believe in the simplicity and indivisibility of the soul in order to see the truth of these memorable words.¹

V

Some Philosophical Consequences

Among these, the first that claims notice is that the analysis into points and instants explains satisfactorily why mathematics applies to Nature. It applies because Nature is at bottom, in one aspect, number. The philosophy of Pythagoras comes again into its rights.

The "strife" and the "flowing" of Heraclitus evidently also receive due recognition. But how is it with the "unity" of Parmenides? To answer this question, we must consider the physical relation which is the basis of spatial nextness—and also the absence of this relation between parts of the real which are not next to each other.

In the passage from instant to instant, the forces

¹ *Lettre à M. de Montmort.* Kant, as has already been said, pointed out the fallacy of arguing from the unity of consciousness to the unity of the soul.

in contiguous points strive with each other, and either remain evenly balanced, or the one gives and the other receives energy, according to their quantitative relation. To do so, they must strive in the same instant : but if A is simultaneous with B, and B with C, A and C must also be simultaneous, so that simultaneity extends through all space. Indeed, there would be no sense in speaking of it as one space if its parts were not simultaneous.¹ On the other hand, non-contiguous forces are disjoined, as we saw, and do not co-operate, except as they effect changes in the intervening forces that connect them.

By this process of joint striving, the energy resident ultimately in points is redistributed from instant to instant, and its parts are rewoven into a new fabric. In changing their places the ultimate units of energy do not lose their identity—there would be no sense in speaking of them as moving if they did not remain the same—and, though the identity through time of different bits of energy may not be traceable empirically, this identity appears quantitatively in the principle of the conservation of energy.

What, then, is the bearing of these facts upon the problem of the one and the many ? It is the custom to discuss this problem in the form of the question of “external” and “internal” relations. Let us consider this question first in the case of time, and then in that of space.

¹ This seems to contradict a familiar thesis of the theory of relativity ; but I incline strongly to the view of Sir J. Larmor, Bergson, and Whitehead that relativity may be reinterpreted in terms of common-sense notions of space and time.

If reality at one instant may truly be said to give rise to reality at the next instant—and there is no alternative to this except the view that the two are wholly unconnected—then, in the establishment of a temporal junction, what was internal has given rise to something external. For at the first instant the real of the second existed as a potentiality, and at the second instant this potentiality has actualised itself. The two instants of the real are thus neither *merely* external to each other, nor are they internal to a third thing; but the one generates the other. To imagine a third thing is as absurd as to say that the family is more real than its members. To think of this third thing as timeless is to place the real outside of time, in contradiction with the most obvious fact of experience.

Turning now to space, we saw that the forces in contiguous points strive together, or co-operate. This means that they act as one in producing the redistribution of energy which is their effect. They act as one, because the effect cannot be ascribed to either alone, but only to them both. This effect, if the quantity of energy in the two points is equal, will be continuance of their relation without change; if the quantity is unequal, it will be passage of energy from one point into the other. Thus, in action, powers which are internal to two (or more) points produce an effect beyond each of those points: so that, here again, what was internal has given rise to a new external relation. New spatial junctions between the units of energy are bred at each fresh instant by the

action of those units at the preceding instant. Space, like time, appears to rest on that operation of energies which is the essence of becoming.

But again, it would be fallacious to imagine that, in order that spatial relations may be real, the related terms must be members of a third thing which is more real than they. The only third thing is the effect, which is real in the same sense as its two (or more) distinct causes. And the unreality of the supposed unity appears further, when we consider that, if A and B were members of a third thing, and B and C also such members, A and C would be members of the same thing, which would therefore—like simultaneity—include the whole universe. But this would be in contradiction with the obvious fact of experience that forces in different points are *not* one, but distinct; and, still more, with that disconnection of the non-adjacent, which is the other side of continuity.

The doctrine sketched thus takes middle ground between Monism or absolute unity and a Pluralism which ignores and is unable to explain the fact of connexion. The term "pluralism" being ambiguous, it is desirable to have a special name for this view, and the proper word is that used by Charles Peirce, *synechism*. Synechism is the view that the real is really in space and time; that reality belongs to the parts, not to the whole; and that the unity of the world is not existential, but a unity of law and order. This conception of the nature of terms and relations seems to me not only possible and free from contra-

diction, but the only one in accord with the observed facts.

The universe is indeed a whole, on this theory ; but the whole has unity only for a mind that conceives it ; apart from human thought, its wholeness consists solely in the junctions that bind its parts together. Similarly, relations between non-adjacent parts of space and of time have no existence in Nature, but are sums made by human minds thinking of Nature, and, if the sums have been correctly made, possessed of truth. Leibniz, then, was not altogether wrong in maintaining that space and time are ideal : they are ideal as unified wholes, and real only in the junctions that connect their parts.

I believe that he was also right in holding that reality in general is of the same nature as the self. It is hard to find a suitable name for this nature ; I have used *sentience*, but if that is thought too suggestive of animal awareness, I should be satisfied with Bergson's term *life*, or with Mr. Russell's description of it as a nature midway between the material and the mental. No common term, of course, can be entirely satisfactory for a thing which, being the last product of analysis, is so remote from our habitual objects of thought. It is enough if we recognise that what physicists call *energy*, and admit to be unknown to them, as physicists, in its intrinsic nature, is yet, in one sense, of all things the best known to us, being the nature of ourselves.

V

THE SOUL AND ITS BODILY PRESENTMENT

No higher claim could be made for a theory of cognition than that it permits solution of the problem of the relation of mind and body—enabling us to understand why two such apparently disparate things are conjoined. Our theory, which (1) recognises two forms of acquaintance, sense-perception and introspection, (2) distinguishes, in each, a subject whose nature is feeling, an activity of awareness, and an object of which the subject is aware; (3) regards this object as a real thing or a real state of the self existing independently of the subject, yet, like it, in space and time; (4) defines the “mind” as the self in so far as it is aware—this theory can fairly make the above claim. The union of two things apparently so different becomes intelligible if we suppose that the self or soul, which is the object in introspection, is the same existent which, to the senses, appears as the correlated nervous process.

I make no apology, after the preceding discussions, for speaking of the self as the “soul”. This is the time-honoured name for the existent within a man that knows, feels, and wills. The “psychology with-

out a soul" which has prevailed for the last fifty years was partly due to the justified desire of men studying the soul scientifically to restrict themselves to the observable; but partly also to the mistaken metaphysical notion that real things, physical and psychical, had been finally done away with. Psychology henceforth, if the contentions of these essays are correct, must be a psychology *with* a soul. This soul, if a scientific psychology must be atomistic, will not be "simple and indivisible", but complex and divisible (not divisible, however, without annihilating or parcelling its awareness)—like the nervous process which is its manifestation. Heraclitus said that "dry souls are the best": imitating his manner of expression, we may say that the best souls for just thought and wise action are composite ones.

A theory of the relation of body and soul has long been known, called the "double aspect" or "one substance" theory; but, in the absence of a correct doctrine of cognition, the exact sense of this theory has remained vague, and it has more often been understood to be the theory of an unknowable substance with two knowable aspects—an idea rightly condemned—than to be the theory of a soul or self, knowable to perception as the body, and knowable to introspection in its essential nature. It is this second form of the theory which explains the psychophysical relation.

Confusion has persisted in this question through failure to make the necessary distinctions: and, in particular, that between the subject who is aware,

the awareness, and that of which he is aware. The subject, after rejection of a *res cogitans* or soul, has been supposed to be identical with the awareness—as by Kant, with his introspectable “I think”; at a later stage, subject and awareness both are absorbed into the datum of awareness—as by William James, in consequence of his denial of the existence of “consciousness”. Only by restoring these lost distinctions, and so recovering the necessary number of categories, can a view of things be reached capable of explaining the connexion of body and soul and elucidating the mechanism of awareness.

It would not be possible, however, to explain the connexion in the way indicated, if, quite apart from metaphysical distinctions and theories of cognition, the observed relations between physical facts and mental facts were not such as to support and indeed require the theory. There must be a certain correspondence and mutual necessitation between bodily processes and states of the soul, if the soul is to be the real thing that appears as the body. Let us mark this correspondence and mutual necessity by the name *psychophysical correlation*. When, to bare correlation, the denial of causal relations between body and soul is added—a situation which becomes intelligible only when bodily processes and psychical states are recognised as two diverse ways of apprehending the same real thing—the view which results is that commonly known as *psychophysical parallelism*.

My first task must be to show that mental events and bodily events do in fact run parallel to each other,

and to make clear the sense in which the assertion of their parallelism is to be understood. By doing this I shall provide the empirical premiss on which our metaphysical theory of the unity of body and soul must rest.

I

Psychophysical Parallelism

This doctrine (for doctrine it is, in view of the denial of causal relations) has found a severe critic in Bergson. At the Philosophical Congress of Geneva in 1904 he read a paper, then called "Le parallogisme psycho-physiologique", in which he undertook to disprove it. I was among his auditors on that occasion, and I remember the awed silence in which his communication was listened to and the commotion it caused. It created something like consternation among his French colleagues, many of whom were parallelists. He has since republished the paper in his volume of essays, *L'Énergie spirituelle*, with the altered title, "Le cerveau et la pensée : une illusion philosophique". Having had more than twenty years to reflect concerning it, and having felt very early in that period that I could put my finger on a weak point in his argument, I wish now, in no polemical spirit, to review his reasons for rejecting parallelism, with the aim of making clear the exact sense in which, in my judgement, the doctrine is true.

Let me observe, before stating Bergson's argument, that it is directed at the same time against two quite distinct positions : (1) that there are two real series—

that is, against metaphysical dualism ; (2) that between the two empirical series there is a close correspondence—or what he calls *équivalence*. Equivalence he defines as a degree of correspondence such that “a given cerebral event carries with it a given psychical state” ; or such that “a superhuman intelligence who witnessed the dance of atoms in the brain, and possessed the key to psycho-physiology, could read in the working brain all that passes in the corresponding consciousness”. He might very well be right about the first matter and wrong about the second. Or at least, there might be enough correspondence to justify our suggested theory, but not enough to warrant the assertion of “equivalence”. But the strange thing is, that he appears to be employing a metaphysical argument in order to disprove an empirical relation—a relation which, if it exists at all, can be established only by an enumeration of facts, and disproved only by pointing to facts of an opposite sort. But let us see what his argument is.

His thesis is that parallelism cannot be stated without contradiction. For it must be stated either in “idealistic” language, or in “realistic” language : and when we attempt to state it in either, we find that we are unconsciously slipping into the other language, which is inconsistent with it. If parallelism cannot be expressed—such is his argument—in any single language, the doctrine falls to the ground.

I have put the words “idealistic” and “realistic” in quotation-marks, because Bergson means by them—as he is careful to explain—not the theories ordin-

arily denoted by those terms, but the two antithetical views as to the nature of the real which in an earlier passage we called *phenomenalism* and *substantialism*; the former being the view that the real consists entirely of apparents or what Bergson calls *images*, and the latter the view that it lies behind or is distinct from the *images* and consists, as he says, of *pouvoirs et virtualités*, or, as I should prefer to say, of something that has power and therefore involves eventual as well as actual being. No fault can, of course, be found with him for his employment of terms. And his description of the former view as making the real consist entirely of the *étalé* and the *étalable* is a beautiful example of the art with which he is able to make an abstract conception vivid and apprehensible.

Let us then follow his argument as to the impossibility of stating parallelism in either of these languages, and see whether he succeeds in proving that it is unstatable; and, first, in phenomenalist language. According to phenomenism, an object, and the perception of that object, are one and the same entity: "the perception is in the object", in Bergson's oft-quoted words. If it is in the object, evidently it cannot be, at the same time, in or connected with the brain: to suppose such a connexion is to withdraw the *image* from its place in the world outside us, and give it, by a sort of reduplication, also a place in or connected with the brain. Evidently the *images* which are external objects and the *images* which are brains are two co-ordinate parts of the one extended world of *images*: and we are "prestidigi-

tating", as he justly says, if, on a phenomenalist theory, we attempt to recognise a special connexion between perception and the brain. In short, Bergson has no difficulty in proving that phenomenism cannot admit a special connexion of mind and body.

In stating this conclusion, it is true, he falls into a slight inaccuracy, which has the effect of misrepresenting the real situation and of burdening the phenomenalist parallelist with a grosser error than he in fact commits. For Bergson says that, in crediting the brain with the power of enabling us to perceive *the whole* of the outer world, the parallelist is making the *partie* equal to the *tout*. But what parallelist ever maintained that we can perceive the whole of the physical world at once, and that the psychical correlate of a single cerebral event is the perception of all things? What is correlated with a single cerebral event is, of course, only the perception of one thing or field of things at a time; and the correct statement of the error of the phenomenist parallelist is, therefore, that he unintelligibly connects one part of the world of *images* with another part, the external object *qua* perception with the event in the brain.¹

¹ Mr. Russell's "causal theory" of perception is of course not phenomenist, and it is a great advance on his part to have recognised that perceptions are in some sense in the brain; but when he says that what is in the brain is "percepts"—that is, sense-data or *images*—and that real external things are reached from these by "physiological inference", I think he is failing to distinguish between sense-data and sensations, and, in so far, lays himself open to this destructive criticism of Bergson's. For from sense-data only other sense-data can be inferred. External things do not consist of sense-data but of something like sensations, and it is these that are in the brain.

But Bergson *has* proved that parallelism cannot be stated in terms of phenomenalism. Plainly, he has shown that, when the attempt is made to state parallelism in phenomenalist language, the parallelism disappears. He does not add, as I think he might have, that his argument is equally fatal to any attempt to state interaction—interaction between objects and perceptions—in phenomenalist language: since, on a phenomenalist theory, there are no perceptions, distinct in their existence from objects, which might interact with these (and Bergson's own interactionism asserts interaction, not between objects and perceptions, but between objects and memories).

So much for phenomenalist parallelism. Let us now see how parallelism fares when the attempt is made to state it in "realistic" or substantialist language. Substantialism is the view that underneath or distinct from the *images* that are *étalées* there is a substratum of the existent, not occasional, as perceptions are, but continuous and permanent though changing. This substratum, in Bergson's view of it, consists of *pouvoirs et virtualités*, and is characterised by what he calls "interpenetration"—that is, the mutual involvement of all with all. Perception affords no knowledge of it, being purely a matter of practical adjustment. It is not in space, for space is an illegitimate separation of it into parts, which, in the thing itself, are not really separate. It is thus unknowable, and one, a single undivided power. In a word, the conception of substance

which presents itself to him as the opposite of the phenomenalistic view is that peculiar to agnostic monism.

Can parallelism be stated in this language? One member of the required antithesis is clear enough: namely, the *images*. These are separate from one another, so that one of them at a time may be conceived as being the correlate of the nervous process; they are no longer, as they were on the phenomenalistic theory, at once objects and perceptions, but figure now—since objects, really existent ones, have melted into and disappeared from view in the one substance—solely as perceptions. The difficulty that prevents our setting up a parallelism is now on the other side. It lies in the impossibility of isolating a part of the one substance from the whole, so as to have a nervous process or cerebral event to which the perception shall be parallel.

Here again we must admit that, on the basis of the conception of substance which he himself entertains, Bergson has made out his case. He has shown conclusively that parallelism is as unstatable in terms of agnostic monism as it is in terms of phenomenalism.

Has psychophysical parallelism, then, been refuted? No: for there is another form of the substantialist view, which it does not appear to have occurred to Bergson to consider. This is the gnostical pluralism or synechism set forth in these essays. Why must the substance of things necessarily be one, and not composed of parts that are divided from one

another in Nature as much as they are for the perceiving mind? Why must perceptive acquaintance exhibit solely phenomena, and be incapable of revealing the things themselves, it may be but imperfectly and in part erroneously? Why must the intellect be incompetent to separate the erroneous in perception from the true, so as ultimately to give us a vision of things as they really are? Why must human cognition be no better than ignorance?

If real things are in fact spread out in space and distinct from one another, as we ourselves maintain, evidently there is no difficulty whatever in supposing a cerebral event, distinct at the moment of its occurrence from all other physical events (however necessary these may have been to its production), and thus obtaining the indispensable other member of the psychophysical correlation. We already have the perception or *image*: and pluralistic substantialism gives us its real counterpart.

It is true that this is not the last word of the matter; the parallelist is not yet out of the woods. For, in the light of what has thus far been said, he might seem to have asserted a metaphysical dualism—an ultimate duality of the physical and the psychical. But this is an illusion, for the duality really asserted is that of an existent which appears to be physical, namely, the cerebral event, but whose intrinsic nature remains to be discovered, and, on the other hand, the appearing of an outer object: and a view is thinkable which would resolve this duality into unity, by supposing that the cerebral event is, in its own

nature, the feeling by the use of which as a sign the outer object appears. At a touch the apparent metaphysical dualism vanishes, and gives place to a duality of the real and the apparent. It then remains only to explain, as I have sought to do in the preceding essays, how the use of feelings as signs can cause objects to appear.

Let us do entire justice to the keenness of Bergson's criticism by admitting that his argument is valid as against any interpretation of parallelism in the sense of a metaphysical dualism. He has effectually disposed of the notion that consciousness and the nervous process are two real series running along side by side. But, this admitted, we must insist that parallelism is perfectly intelligible and not open to criticism, if it is merely the recognition of an empirical concomitance (yes, and a certain degree of "equivalence") between cerebral events and those *images* which are perceptions of outer objects: and this, I think, is the sense in which parallelism is ordinarily asserted by psychologists and neurologists—with, it is true, a warning against supposing that interaction can take place between a cerebral event and the sensation by means of which an outer object appears; a warning that becomes intelligible when we learn that they are one and the same thing. Bergson himself has proved, as we have seen, that perceptions cannot interact with physical objects.

It may be instructive to consider how Bergson comes to think of "realism" or substantialism as necessarily having the form of agnostic monism, and

to overlook the other, more fruitful possibility. This is a consequence of the two assumptions on which his theory of cognition is based: (1) that *images* (the original ones, prior to all interpretation) are actual constituents of the real world—*i.e.* phenomenalism; (2) that the appearing or perception is “in the object” or *image*—a view to which we have given the name of objectivism. From the former assumption it follows that all *images* are equally real, no distinction being possible between things that appear falsely and things that appear truly; error in knowing occurs only through misinterpretation. From the latter assumption it follows that, with the appearing, its unity also—the “unity of consciousness”—is in the object, and is therefore a fundamental character of the real. That togetherness, relatedness, and mutual involvement of parts, which on our view characterises objects only in so far as they appear, is thought to be inherent in their existence and present there even when they do not appear. The whole thus swallows up the parts; the supersensible relations that join the apparent parts are considered to be nearer to the being of the real than these parts themselves in their separateness; the separation is interpreted as a falsification by intellect for practical ends, dividing the indivisible. The intellect cannot tell us the truth, but only what have been happily called “vital lies”.

This, I think, is the logical sequence by which arises Bergson’s peculiar monism—his doctrine of “interpenetration”, or the mutual involvement of

all with all ;¹ his view that *de jure* we perceive the entire universe, though *de facto* we perceive only a minimal part of it ; and his notion of the brain as serving not so much to enable us to perceive this part, as to prevent our perceiving the stupendous whole. The necessary result is that the only substance he can conceive, and oppose to the multifarious *images*, consists of the supersensible relations that bind them together into a whole, or, as he says, of *pouvoirs et virtualités*. And his philosophy, worked out with such consummate fineness and care, is simply the logical consequence of objectifying animal awareness or appearing, and turning it from an occasional relation between a self and its environment into a universal characteristic of the real. This is objectivism, the opposite fallacy to that now so generally condemned under the name of subjectivism.

The fallacy begins with phenomenalism, or the complete identification of the apparent with the real. When a real thing, that may be more or less different

¹ In view of the analysis of continuity given in the preceding essay, the only "interpenetration" I can recognise is that by which the real of each present instant brings forth the real of the next. If this word meant only that the parts of the universe are in fact found together, in their actual spatial and temporal relations, and exist only as parts of that system, it would be but a name for an obvious fact. But if it means, as in Bergson's mind I think it does, that really there are no parts, but only a whole (not then entitled to be called a whole), the parts being constituted by the relations and, as parts, merely apparent, this is a Parmenidean conception of the real which, however it may have appealed to Plato, seems to me wrong. Existence and force do not belong to the whole, but to the parts in their extremest fineness. A whole exists if its parts exist, but the parts do all the work. This, if I understand him correctly, is what Mr. Russell means by his "logical atomism".

from the apparent thing, has been eliminated, the same scepticism that destroyed the object is brought to bear upon the subject ; and, with the elimination of this also, the awareness or appearing becomes absorbed into the apparent thing. It will be seen how important it is to recognise that distinction between the apparent and the real which is made necessary by the fact of sensible (*i.e.* non-interpretative) error.

As sensible error—the inability of both perception and introspection to present their objects with entire truth—is the fact of which our theory makes use to explain the connexion of body and soul, our next task must be to examine as to the respective amounts of truth and of falsity in each of these forms of cognition.

II

Truth and Falsity in Acquaintance

Let us put out of our minds for the time being all those instances of error in which it is due to misinterpretation—to mistaken inferences as to the context of that with which we are immediately acquainted—and ask how far it is possible for acquaintance itself to be untruthful : holding up sensibly before us an apparent thing which differs in its qualities or in its nature from the real thing actually present. What are the proportions of truth and of falsity in the predications made by perception and introspection ? How great is the power of these two forms of acquaint-

ance to report adequately the real things which are their objects ?

The sort of error with which we are now concerned is not that occasional and generally recognised error of which ordinary illusion and hallucination are examples ; but the usual and, as we may say, *normal error* which inevitably enters into all perception and introspection, being a result of the natural mechanism by which these two forms of awareness are produced.

1. *Normal Error in Perception*.—Perceptive cognition is of course sufficiently true for practical purposes, and the amount of information it can yield is greatly extended by the use of instruments. Nevertheless, sensible knowledge is largely symbolic, and so contains a large element of normal error.

A good example of this is colour. If, as we have seen, colour owes its simplicity, its irresolvability into anything other than itself, to the process of simplification, then clearly there is nothing exactly like colour either in the external thing or in the self ; but colour is merely apparent. What really is in the thing is only a texture of its finer parts, such that it reflects light-rays of a certain wave-length and not others ; what really is in the self is only a similarly complex arrangement, in space and time, of the elements of which the self is composed. And analogous statements will be true of the qualities characterising sounds, smells, tastes, and touches.

Thus quality—the qualities, at least, which we meet with in everyday life—disappears from the real

world, and does not remain to trouble and confuse our philosophy, as it did that of Aristotle.

Space, on the contrary, appears as a deliverance of perception which is not erroneous—at least, not wholly so. Simplification does, indeed, make us see space as simpler, as composed of vastly fewer minute parts, than it is in reality (for, to see space as it really is, we should have to be capable of perceiving points). But the nature of space, as continuous spread-outness or extension, still remains as a character of the visual sense-datum, and remains (according to the theory here maintained) because the sensation by the use of which as a sign this datum arises is in space. This character of the predicated visual sense-datum therefore possesses partial truth, since it reveals truly the essential spread-outness of the real. Even colour, though a product of simplification, varies with the constitution of the sensation and this with the constitution of the external thing, and therefore has symbolic truth.

By the same reasoning, the place where a thing is seen as being will (apart from ordinary illusion) be its true place—that is, perception will have told us the truth concerning the spatial relation between the thing and our bodies. Of the magnitude which the seen thing appears to have, if by this we mean its sensible magnitude, we cannot, as was before noted, say as much. The sensible size of objects at any distance from our bodies—but not necessarily their shape—will be an instance of normal error. Nevertheless, since as a result of past experience we always

interpret distant objects as having really the size that *would* be sensible if they were close to us, and so correct the error of sense, it cannot be said that perception, in the usual wider meaning of the term, shows them to us erroneously.

Sense-perception, then, though symbolic, is not *entirely* symbolic. Symbols would not be such if—like those used in algebra—they did not possess a soul of literal truth. If a marksman hits the bull's-eye, it is because he has aimed straight—that is, seen the mark where it really is. Measurements with a yard-stick give (approximately) literal truth; and so with all the measurements of physicists.

Coming now to time—the time of perceived events (awareness of which involves primary memory as well as perception)—it is plain that we are no more capable of perceiving the infinite multiplicity of real time, that sequence of successive instants by which time is spun out infinitely fine, than we are of perceiving the corresponding multiplicity of space; and that time, for our perception, is simplified into the “specious present”. This present *is* specious: as we realise when we consider that, during its momentary lapse, light-rays have travelled through space at the rate of 300,000 kilometres a second, and must have accomplished this feat by passing through the individual kilometres in $1/300,000$ ths of a second . . . and so on *ad infinitum*. But again, the *nature* of time, as succession, still appears in that simplified datum which we call the specious present, or at least in the relation between successive specious presents

of which we become aware by the help of primary memory : and acquaintance, therefore, in so far as it shows us time, cannot be accused of showing it to us altogether wrongly. As in the case of space, it can show us time at all only because the sensations which mediate the awareness are in time.

Thus our discussion of normal error in perception elicits, along with the error, a modicum of truth, sufficient, be it observed, to vindicate the truth of natural science ; and justifies us in holding that the knowledge we obtain by the use of our senses is, when it has been purged of its element of normal error, true knowledge. That a theory of knowledge should be gnostical may seem strange ; but our theory is so, thanks to its basis in physiological psychology.

2. *Error and Truth in Introspection.*—Our confidence that the real is (to the above extent) as perception presents it would not, however, be justified, it would be only a dogmatic faith, if the percipient subject were not himself a part of Nature, and if he were not able to satisfy himself, by introspection, that the signs he uses in perceiving are spatially spread out and temporally continuous, and therefore suitable for conveying the spatial and temporal characters of external things.

When the subject is conceived, as he is by transcendental idealists, to be identical with the mere awareness—the “ I think ”—or, as he is by objectivists, to be a name for the datum of awareness considered in a different context, the real, on our supposition that it lies beyond the subject and is reached only

by intent, appears at first sight so different in kind from the subject, that the nature of the subject can afford no clue to its nature. No wonder if, in this situation, the unknowableness of such external things soon leads to a denial of their existence. According to our theory, the situation is quite different. The knowing subject is not awareness, nor yet the object of awareness in a different context, but is the self who is aware of that object. This self and the object of which he is aware are two mutually external parts of Nature ; the two being related as organism and environment, and both included in the one world of space and time. In all cognition one part of Nature knows another part. Furthermore, in introspection this knower knows himself : and, through the medium of his introspective knowledge, obtains a clue to the nature of real things outside him. For out of these things the knowing self has been evolved : and their nature must therefore be such that they could give birth to the self.

Thus it is important for us to inquire how far introspection shows states of the self as they really are. To answer this question, we must consider the nature of the introspective act, and the fitness of the resulting data to report the states truly. But, before doing so, let us note certain consequences as respects the nature of the states introspected which follow from James's disproof of the observableness of awareness.

(1) Not so long since, it was the custom to speak of the objects with which psychology deals as

“states of consciousness”. This phrase had the defect of implying that awareness is introspectively observable, and that the introspectively observable includes sense-data. Now undoubtedly it is part of the business of psychology to analyse acts of awareness and to account for sense-data. But sense-data are not given to introspection; they are given only to sense-perception. And, if James is right, acts of awareness are never given at all. They occur, and we can learn of their occurring, but they are not introspectively observable. From this it follows that the only objects actually discoverable by introspection are feelings and sensations.

Yet psychologists continue to suppose that, besides these, or as an element in these, we discover introspectively awareness, that is, a relation of the subject to its momentary object. They think of fear or desire, for example, as modes of being aware of an object, and suppose this subject-object relation to be a part of that which is introspectively observed.¹ How come they to commit this error? How is the appearance of an actually observable “activity” produced?

¹ Thus Prof. Stout (in Postscript to his paper on “The Nature of Introspection”, *Proc. Arist. Soc.*, supplementary vol. vii, pp. 244-245) maintains that a part of what we are “introspectively cognisant of”, in the case of fearing or desiring, is the “immanent relation of subjective process to its object”—in other words, the *act* of fearing or desiring, the subject-object relation here involved. He says: “I agree with Ferrier that we are never cognisant merely of an object, but always of an ‘object *mecum*’.” This may, for aught I know, be true as a statement of fact; but if it is true, its meaning is, in my view, that we never merely perceive, but always simultaneously introspect—not that what we observe introspectively is the subject-object relation or “act”.

James held that the only observable "activity" consists of muscular sensations in the eyes, head, throat, and other parts; and in this I think he was right. But he did not see that these muscular sensations are the report of that reaction of the organism as a whole, by which the visual sensation is used as a sign: so that the observable muscular activity bears witness to the unobservable act of awareness.

Let us apply this to the special case of fear. According to James's theory of emotion, fear gets its special character from the sensations of trembling, rapid heart-action, paleness, and the like, which report its bodily expression. Without these sensations, he thinks that awareness of the fear-exciting object would be a "cold, intellectual" state. Yet the vision of the object, with its suggestions, must be such as to cause an unusual overflow of nervous energy, and there is no good reason for not including this exciting power of the vision in the state called fear. The total state, therefore, is a compound of two elements—exciting visual sensations, and sensations of the reaction they cause. We shall find this dual nature of the states which are actually observable to be true in a great many other cases.

Take desire, for instance. Desire for food is accompanied by watering of the mouth, and in all desire there is an incipient reaction of approach to the desired thing. Thus the thought of the thing, visual, gustatory, or other, leads to sensations of reacting to it, and the composition of the total state

is dual. Pain, again, is composed partly of an intense sensation and partly of a felt reaction of aversion, a sense of the sensation's intolerableness. In all these cases the two components are fused, and give rise by simplification to an introspective datum having a simple quality. Even the sense of distance, as we have seen, is partly visual and partly muscular in its origin.

The objects, then, that appear to us in the form of introspective data such as fear, pain, desire, are groups of sensations—not "modes of awareness". The relation of the self to the feared, desired, or painful thing, though real, is not a part of what is introspectively observed. We are aware, but our awareness is not a possible datum of introspection. We can learn of it only by reflection—by combining with each other in thought the object known in perception (or whatever the form of awareness may be) and the object known in introspection. But if the latter object, the state of the self, did not contain a sense of activity as one element, we could never learn of it.

(2) Turning now to the nature of the introspective act, it has been held in preceding essays that introspection is cognition of a state by means of an image or a later phase of it. The special power of introspection to exhibit its objects truly is due to the fact that the object and the state by means of which it is known are identical in nature and in constitution. The introspective datum, which arises by using the state as a sign, might therefore seem capable of exhibiting the state with entire truth. In fact, however,

the states we observe introspectively appear to have simple qualities, such as pain, fear, desire, or such as blue, sweet, warm.

We commonly assume that our states are just as they appear, and that there are no real states in any way different from the states as introspectively observed. We say to ourselves that "the being of a feeling is to be felt", and that "as a feeling feels, so it is". Let us see how much truth there is in these current dicta.

They contain a subtle ambiguity. A feeling of course is a feeling, and, in order to exist, must be that particular feeling which it is; but it does not need to be "felt" in order to exist, for "felt" in this passive form means introspected. It is not necessary to the existence of a feeling that it should be introspected. Visual sensations are not introspected at the moment when they are used for seeing, yet they exist, and are sensations. They are of the nature of feeling, but they are not "felt". What we feel by their means is the sense-datum. In order that they themselves should be felt, we must turn our attention to them. We commonly do this only when a sensation is specially intense, or pleasant or painful.

Now it cannot be denied that, when we turn our attention to a feeling, it appears to undergo an increment of being—though it does not come into existence then, for a feeling must pre-exist unobserved in order that it may catch the attention. It becomes what psychologists call "clearer". If this were a change in the feeling itself, our attention would have

altered it, and so defeated our aim of becoming aware of the feeling as it really is. What happens must therefore be that the feeling, without itself undergoing any change, becomes an object of introspection and thought. The feeling, which before lay outside the field of objects of awareness, is taken up into this field.

In cognising feelings, even more than in cognising external things, we naturally tend to be naïve realists. We suppose that each feeling *is* exactly as it is *felt as being*—that is, as it appears to introspection. This may be as great an error as we have seen it to be in the case of external things. We must therefore examine carefully whether introspective predicates are adapted to reveal states of the self exactly as they are.

Introspection, no less than perception, exists primarily for practical purposes. We need to become aware of our states only when they are specially intense, painful, or pleasant, for the purpose of taking the requisite action. For this purpose it is unnecessary that we should introspect the fine parts of which a state is really composed. These fine parts are therefore covered up by the process of simplification. Projection, or rather introjection, also takes place, but this process only refers the state to the place within the body where it really is, and therefore is not misleading. But, owing to simplification, all introspective data are vague.

This limitation on the truthfulness of introspection does not, however, prevent it from conveying truly

the *intrinsic nature* of its objects—that nature which we have agreed to call feeling or sentience. Simplification has only the effect of making it impossible for us to seize our own states otherwise than in the gross or, so to speak, in great lumps. Besides the fundamental nature, we can also detect within these lumps—certainly in the case of visual sensations, and I think really in all—spatial extensity, and—in all cases—temporal continuity. Both the extensity and the continuity are greatly simplified; yet are still so definite that we are able, owing to the special truthfulness of introspection, to grasp what space and time really are.

Thus introspection, despite its vagueness, is the fountain of truth concerning the nature of things. Even sense-perception, when properly corrected, tells us much truth, and reveals with far greater minuteness and exactness their spatial and in some respects their temporal arrangement; but the emphasis, in sense-perception, is on their relations, and only introspection reveals their nature.

Now let us draw the conclusion that follows from this examination of the proportions of truth and of normal error in the two forms of cognition. Since introspection reveals truly the intrinsic nature of the self, and since the self is a part of Nature at large, arising by processes purely natural out of the other parts, we are justified in inferring that these other parts, which in perception appear only as the physical things signified by our sensations, are fundamentally of the same nature as the sensations; or, to put it

otherwise, are of such a nature as to permit the evolution of the sensations out of them.

This whole way of thinking rests, it is true, on the assumption that the deliverances of perception and introspection, so far as they do not contradict one another, are *true*, and that we are able, although but imperfectly, to know the real as it is. But this is the assumption made in ordinary life and in science, it is the expression of our instinctive trust in the truthfulness of acquaintance, and the only alternative to it is to doubt the possibility of knowing anything at all.

III

The Identity of Body and Soul

Having shown that psychophysical parallelism is not open to Bergson's objections, and that both perception and introspection contain an element of normal error, I can now state the theory of the relation of body and soul which results from these facts.

The possible theories of this relation are (1) dualism, (2) materialism, (3) idealism, and (4) the identity theory.

Dualism is the theory of common sense. The mind is so different a thing from the body, that it is natural that men from the earliest ages should have thought of them as two distinct existents. That mind and body are in fact more intimately connected than this, is shown by insanity, which depends on bodily causes. It might have been inferred from

the fact that we need to eat and drink, and that starvation brings mental alterations in its train. But dualism is now generally abandoned. What really is lodged in the body is the nervous system, which in its intrinsic nature is the soul; the soul, or nervous system, and the rest of the body are the real duality.

Materialism, whether asserting the dependence of consciousness on matter, or on an unknowable something, leaves the relation unexplained. It cannot account for the origin of the mind.

Idealism (and current phenomenalism which really is a sort of idealism) must be rejected because it is a sceptical theory.

The only theory that can explain the relation, and account for the origin of the mind, is the identity theory.

We have seen that substantialism has two forms: a monistic form, which conceives substance as unknowable, and a pluralistic form, which conceives it as known in perception and introspection. If, confident that cognition is at least partly truthful, we accept this second view of substance, the alternative presents itself of supposing (1) that the soul is an existent additional to the entire system of things known through perception—in which case our study of cognition has brought us no nearer to understanding the connexion of body and soul; or (2) that the soul, known through introspection, is the same existent which, when it is known through perception, appears as the nervous process or as the entire organism. By choosing this second alternative we explain the con-

nexion of body and soul, and place the soul in such a relation to the rest of Nature that it is possible to account for its origin.

Let us consider in a concrete case what this explanation means. Suppose a man to be looking at a tree, and having in him the sensations necessary for that purpose, and an anatomist meanwhile to be beholding the nervous process in the man's brain.¹ Such an experiment cannot be actually carried out, because the nervous process cannot be observed without interfering with it, and because no microscope can reveal simultaneously all that is happening in the nervous system ; the experiment is only an ideal one, but that need not prevent our asking what is the existent which the anatomist would see.

He would not see what the man sees—the tree : for that is a thing made present to the man by *using* his sensations. Nor would he see the man's act of seeing : for that is this use, and is not visible even to the man. What he would see, by using his own sensations, would be the sensations of the man. These sensations constitute the man's soul, in the state in which it is when he sees a tree. But the anatomist would see them, not in all respects as they really are,

¹ Dr. Morton Prince used this way of expressing what the identity theory means in his book, *The Nature of Mind and Human Automatism* (1885), and also in a later article in *Brain*, from which latter I think I must have taken it for use in my book, *Why the Mind has a Body* (1903). His article in *Mind* for January 1928, "Why the Body has a Mind and the Survival of Consciousness after Death", is an admirable exposition of our common theory, to be commended for its honest outspokenness. The natural inference from this theory, as from the facts of experience, is that consciousness does not survive after death.

but in that altered form, infected with normal error, which is characteristic of all perception—in other words, as a nervous process. For all that, he would learn, by inspecting the man's nervous process thoroughly, a great deal more about the man's sensations than the man himself knows.

Could the experiment be arranged so that the man himself would play the anatomist, and observe his own nervous process? This could easily be managed by means of one or two mirrors. The experiment, so modified, will serve as a test of our theory. But if the man is to see his own nervous process, he cannot at the same time see the tree; at least, this would unduly complicate the experiment. Let us suppose, then, that what he sees is only his own nervous process. A new fact about seeing now needs to be considered. Since it takes a certain time for light-rays to pass from this process to the mirrors and return from these to his eyes, and for nerve-currents to go inward to his brain, the nervous process which he at any moment sees will be that correlated with an earlier vision—with vision of an earlier phase of the continuous process in his brain. But if we suppose this process to continue for a short length of time without alteration, such continuous vision, always of an earlier phase of the nervous process, is perfectly possible. Applying now our theory, what the man sees, in the partly erroneous form of a physical process, is the state of himself by means of which he saw a moment before. Thus our theory is in complete accord with the facts.

When I see a woman weeping and wringing her hands, I am perceiving in that physical form something, the nature of which is more truly expressed by saying that there is a human soul in pain. When we hear people talking and laughing, we behave as if we had an immediate though imperfect vision of their souls. It is but carrying these everyday facts to their logical conclusion when our theory says that the existent which an anatomist would see as the nervous process is the soul.

It may occur to some one, as a difficulty in the way of the theory, that a nervous process consists of nerve-currents—that is, streams of nerve-impulses—and that these presuppose permanent material nerve-fibres, to which they are related much as a river is related to its banks. This of course is true as a matter of fact. But contemporary physics makes no ultimate distinction between material structures and the events occurring in them; and the physical facts therefore require only to be translated into the language of sentience. Sentience must not be conceived too much after the model of human feeling. When the facts have been thus translated, no doubt it will be found that the self (which includes the stores of memory, our instinctive and acquired tendencies when not operative, and much more besides) is far wider than the momentary sensations and felt reaction. But this wider self, though unconscious as opposed to conscious, is not material as opposed to sentient in its nature, but is only an extension of the sensations which form the conscious part of it. Between the

conscious and the unconscious there is no more a difference of nature than there is between the nerve-currents and the nerve-fibres that support them.

Observe how happily our theory settles the long-standing controversy over the "efficacy" of consciousness, giving their just dues to interactionists, parallelists, and even materialists. The self interacts with the rest of the real, because the nervous system interacts with the rest of the physical world. There is no interaction, but only a strict parallelism, between the self and the nervous process, because the latter is a perceptual rendering of the former. Awareness is inefficacious, because it is a mere function; but the conscious self is as efficacious as we actually find it to be when we will.

When the connection of body and soul is conceived in terms of metaphysical dualism, consciousness appears as a mere "phosphorescence" mysteriously attendant upon brain-action. This is the notion which the phrase "conscious-automaton theory" is apt to suggest. The conscious self seems passive and helpless, like the whistle of a train or like its shadow. But when the facts of correlation are re-interpreted in terms of the identity theory, an extraordinary reversal of rôles takes place—a pleasant turning of the tables upon the too confident materialist. For that which appeared to be a material machine bursting into action quite independently of its conscious tenant is found to be, in its true nature, that tenant himself, and the manifoldness of the machine to be only a revelation of the mani-

foldness of his complex soul. The principle of the conservation of energy, so often appealed to as contradicting interaction, is found to ensure it. The assertion, apparently required by the facts, that mind depends on matter gives place to the harmless statement that matter is such only for awareness, and that awareness is a function of the active soul.

VI

ON IMAGES AND THINKING

IN the preceding essays I have put forward a theory of the nature of awareness, and discussed its application to the two forms of acquaintance, sense-perception and introspection; the characteristic of acquaintance being that the real thing with which we are acquainted is actually *present*. I must now try to show that this theory can deal satisfactorily with the sort of awareness which we have in thought. I use the word "thought" in a broad sense, to include every instance of awareness in which the thing of which we are aware is *absent*—that is, to cover memory and expectation as well as imagination and conception. These forms of representative awareness evidently grow out of and presuppose that presentative awareness which we have in sense-perception and introspection; and the same theory which explains the latter should therefore suffice to explain the former. Acquaintance is the door through which knowledge of the real enters the mind. The knowledge *gained* in acquaintance is in thought only *used*.

Before engaging in this task, it may be well to repeat certain cautions as to the exact sense of the

theory. When I say that awareness involves reaction as well as sensation, and that the union of these two has the effect of simplifying and projecting the sensation, I do not mean by "sensation" what is ordinarily meant by that term, namely, an experienced quality, or experience of a quality. What I mean is the state of the self, the portion of sentience, which by evoking the right kind of motor response causes us to be aware of the quality. Most contemporary philosophers recognise only, on the one hand, *data* of awareness—by which they mean either sense-data or apparent things—and, on the other, a physical process in the nervous system, into the nature of which, if they distinguish it from data, they do not inquire. This leaves the connexion between the two unexplained, and, I think, inexplicable. To philosophers holding these views, the assertion of such an existent as "sentience" will seem daring and unjustified—indeed, they will fail to understand what can be meant. I am right, therefore, in describing this view as an hypothesis, for it is one in the literal sense; it is a "putting of something under", a putting of something real under the apparent—what is put under being a specific nature in the self, such that external things can appear to it in perception and that it can appear to itself in introspection. Critical realism as applied to introspection is of course the ultimate warrant for this hypothesis.

Granted, by the aid of the hypothesis, a sensuous stuff suitable for simplification and projection, the next caution that needs to be given is as to the nature

of these processes. "Projection", which is the physiologists' way of describing the mode of genesis of sense-data from sensations, must be admitted to be only a metaphor, and not a particularly happy one, since it is so likely to be misunderstood. As I have explained, there is no actual transfer of the sensation from its place in the nervous system to a place outside. Nor, again, is what we are aware of, after projection has been effected, the sensation: what we are aware of is an external thing having qualities, some of which the real thing actually possesses and others of which it does not possess. The metaphor is thus doubly unhappy, and it would be better, because less conducive to misunderstanding, to state quite literally what occurs, and say that the sensation, by inciting us to respond as if its external cause were there, enables us not only to intend this cause but also to describe (correctly or incorrectly) its character—the sense-datum being the description which the sensation when used as a sign gives of the external thing.

The mass of sensation used in a given case may be relatively simple, or it may be very complex, consisting of many and different parts; but if these parts, despite their manyness and difference, prompt only to a single reaction—as when we look toward and fixate a leaf or a pebble—the unity of the reaction has as its effect a unity of the intended and sensibly perceived object, the real thing not as it is but as it appears to the mind: and there is therefore "simplification". If, on the contrary, in looking at the leaf,

there are motor tendencies to respond separately to the veins and to the contour, what we are aware of is not simple, not a mere vague whole, but a whole felt as consisting of parts.

I now proceed to apply this theory to the sort of awareness which we have in thinking. My object will be to show that thought, no less than perception, can be conceived in a way consistent with the natural origin of the mind.

I

Nature of the Image

Things are thought of by means of images, and the first question we must consider is whether the image is a new kind of state for which our evolutionary theory cannot account, or is a sort of sensation.

But a terminological difficulty here arises. By a "mental image", psychologists mean what we intuit when we imagine an absent thing; in other words, the analogue of a sense-datum. Now a sense-datum, on our theory, presupposes a state of sentience out of which it is formed by simplification and projection; and the same will be true of a datum of imagination. As I have been using the term "sensation" for the state of sentience, I must use the correlative term "image" in the same way; but since the difference between a sensation and an image, which is the subject now to be considered, corresponds exactly to the difference between a sense-datum and

a datum of imagination, it matters not which of the two we discuss, and the reader is at liberty to take the terms "sensation" and "image" in either sense.

It is natural to think of an image as a sensation reproduced in weaker form. Some persons have very vivid images, but even these images, as compared with the corresponding sensations, are weak. The *crux* of the problem is to give a satisfactory explanation of this weakness. Connected herewith is the important neurological question, how the brain can reproduce a sensory process, even in weakened form, in the absence of the stimulus that originally called it forth. That we should see light when external light acts on the retina and brain is intelligible enough; that, after we have once seen it, the brain should have acquired the power of recreating within itself this special process, is by no means so easy to understand, and ought not to be admitted except upon cogent proofs.

A vivid description of this weakness or faintness of the image has been given by Lotze. The passage had better be quoted in the original German. "Die Vorstellungen unterscheiden sich eigentümlich von den Empfindungen. Die Vorstellung des hellsten Lichtes leuchtet nicht, die des stärksten Schalles klingt nicht, die der grössten Qual thut nicht weh; bei alle dem aber stellt die Vorstellung ganz genau den Glanz, den Klang oder den Schmerz vor, den sie nicht wirklich reproduciert."¹

This passage draws attention well to the peculiar

¹ *Diktate aus den Vorlesungen über Psychologie*, p. 20.

character which a sensation has and an image has not. In so far as this character is lost, Lotze is right in denying that the sensation is reproduced. Further, if by a "sensation" be meant a state called forth by a stimulus from the periphery, the image is not a sensation. Nevertheless we need not assent to the view that it is a state of an entirely different kind, for the following reasons.

The image is a result left behind by the sensation—we have no images that are not copies of sensations. It is presumably correlated with a process in the same central area. Images are not fainter than the marginal parts of the visual field. The image is a state evoked in a different way from the sensation—by a stimulus from another part of the cortex; and no intra-cortical stimulus can operate with the power and the precision of a stimulus from the periphery. Images have not that steadiness which permits us to attend to a seen or touched object for a considerable length of time; when we do this, the object administers repeated blows to the cortical centre, and that may be why the sensation rises to so great a degree of strength. These considerations may perhaps suffice to explain the weakness of the image, without need for the view that it is a state of different kind from the sensation.

I have been speaking of an image of average strength, but there are two extremes: vivid images, and images so faint that we should not call them such, but should say that we think of a thing or have an idea of it. The images of the philosopher Lotze

are more likely to have been of this latter sort. To understand them, we must recall that psychologists mean by an image a certain kind of datum of awareness, and that for awareness a motor reaction as well as an image in our sense of the term is necessary. The object thought of will be defined partly by the image, but partly also by the reaction. Many of the images with which we think are the merest symbols. This can be so, because the image has fulfilled its purpose if it evokes the right reaction. Indeed, the reaction may come to play so great a rôle in defining the object thought of, that the image practically vanishes from consciousness.

An example will help to make this clear. Let us take the familiar one of the child who has learned not to touch the candle-flame, and suppose that the sight of it arouses in his mind an image of the pain he would feel if he touched it. This pain, evidently, is not imagined with any great vividness; it would be most undesirable if imagined pains were anything like as vivid as the corresponding sensations. But the experience of pain is motor and organic as well as sensory, consisting in large part of the recoil and shrinking, the "aversion" as we say, by which we respond to this kind of impression. "Painfulness is intolerableness", it has been wisely said; and an impression only slightly painful may be rendered painless, that is, not unpleasant in spite of its intensity, by suppressing the instinctive reaction. If, therefore, the child imagines the touch of the candle-flame merely as something to be recoiled from, he

will have as complete and even as true an image of it as his interests require.

Now this paradigm may be applied to a great many other cases, and will be found, I think, at least in these cases, to supply a satisfactory explanation of what is actually experienced. The image, in thought, is a vanishing quantity, and we may have what has been called "imageless apprehension". I do not mean that there is no state of visual, auditory, or tactile sentience involved, but that this state is not a clear sensuous image. The doubt that suggests itself is whether motor responses, even when organic responses are added to them, are sufficiently various accurately to define the innumerable different objects of which we in fact think. This doubt will be removed or greatly lessened if I give a list of the kinds of reaction to which it is possible for this theory of the psychological nature of ideas to appeal.

These are : (1) the reaction of *attention*, by which the thing in question is fixated, and its place, size, and shape made present to the mind—originally in perception, but afterwards when the same thing is imagined or thought of ; (2) the *practical* response—that is, the behaviour appropriate to this particular kind of thing ; (3) the *emotional* response—the effects produced by seeing, imagining, or thinking the thing on heart-action, breathing, glandular secretion, etc. ; (4) the *associative* response—suggestion of the further effects to be looked for from this particular kind of thing.

It will be seen at once that these various attendants

and sequents afford much more ample means for designating unequivocally the thing thought of than might have been anticipated ; and that we do not need to imagine an object sensibly, if we can think of it attentively, practically, emotionally, and associatively. In so far as the object is defined in the last three ways, it is defined by its *connexions*, not by its proper being ; and that the brain can retain and reproduce the connexions between objects is of course the most notable and indubitable thing about it.

A field to which this view of the psychological nature of ideas seems to me applicable is the element of apperceptive interpretation which enters into perception. In all ordinary perception there is a large element of thought mingled with the purely sensible awareness ; and I may seem to have unduly neglected or even to have overlooked this important element in everyday perception, though I only postponed its consideration until we could discuss the nature of ideas.

Let us alter a little the example used above, and suppose that the child does not think of the pain even in that slight allusive way, but merely apperceives the seen flame as having a certain tactile quality. For this no image at all is necessary, but only the reaction of recoil bred of his past experience. This reaction is a sort of " conditioned reflex ". It enables him to deal with and avoid the pain just as truly as if he had a distinct idea of it. Now the view I wish to suggest is that much that is usually classed as

apperceptive interpretation is really interpretation not by means of images, but by means of reactions which are of the nature of conditioned reflexes. These reactions are felt through the resulting kin-aesthetic and organic sensations, and what is fused with the visual, auditory, or tactile sensation is not images, but these other sensations. Doubtless there are cases in which images are aroused and become fused with it—as when ice looks cold ; but images, as we have been inclined to hold, are reproduced sensations. If so, the element of sensation is not a “ hypothetical core ” in the sense-datum, but sensation is the sole stuff out of which, by our manner of reacting, the sense-datum is formed.

When I perceive a book, I may of course think of the pages and print which I should see if I opened it ; but this is a thought suggested by the percept, and I do not need to have it in order to perceive the object as a book. I perceive it as a book by being prompted to the act of opening and reading. This felt tendency to a particular reaction is, in effect, a judgement that the object is a book. A hungry man does not perceive food as such by thinking of its taste, but by his mouth watering and his being prompted to the act of eating. If he imagines its taste, that is probably an added thought, and no part of the percept. But it would be going too far to assume that all interpretation takes place by means of reactions.

The judgements which our tendencies to react pronounce upon sensible objects are often erroneous. Suppose I see a patch of snow lying in the shade of

a pine-tree : at the first moment I judge that I am seeing something white ; but on closer inspection I may become aware that the colour is really blueish—as a painter would have seen from the start. Here my reaction has falsified my judgement as to what I see, without in any way altering the sense-datum—which was just as blue when I misjudged it as when I saw its true colour. In this case it is an associative response which has pronounced the false judgement. Such reactions, then, are not among those which go to constitute the sense-datum, and it is a mistake to suppose that the sense-datum has been modified in quality by being fused with an image.¹

¹ It is sometimes supposed that the place of an object is made present to us, not by immediate vision, but by apperception—by our thinking of the seen object as in a certain relation to unseen ones ; and it might even be fancied that its distance is made present to us by our thinking of its relation to the body. That such views are not in accord with the psychological facts may be made clear by a brief discussion of the familiar staircase figure.

This figure, given in all books on psychology, may be seen in two ways : either as a staircase looked down upon from above, or as one looked up at from underneath. How are these alternative visions to be explained ?

In the first essay, I said that distance is made present to us by “reaction and tendencies to reaction” ; the particular sort of reaction in question being that of attention. When we look at this figure, some spot near the middle of it falls on the fovea, and is the fixation-point. This spot calls forth an actual reaction—the reaction of looking directly at it. All the other spots fall on the margin of the retina, and call forth tendencies to reaction ; that is, they incite us so far as in them lies to turn our glance from the central spot to them. The reactions which would be needed for turning the glance to them are *made ready*. They *must* be made ready, in order that we should be able to turn the glance with sureness and precision to the next spot looked at—which may be any point in the three-dimensional space. Imagine the difficulties of a fencer if he had to experiment before being able to look directly at what he now sees marginally !

Now the reactions made ready in the example of the staircase may

The extent to which sense-data may be falsified by accompanying reactive judgements has made me ask myself whether data of imagination—"images" in the ordinary sense—are not similarly falsified, and whether, indeed, all imagined qualities are not in reality thought of rather than reproduced. This is an adventurous notion, and I only suggest it as a possibility. I do not question that the shapes of things are reproduced, for vision of a square impresses a different pattern on the cortex from vision of a circle, and this pattern is revivable; but how the brain can reproduce colours in the absence of the coloured thing is the real point of difficulty.

Is it possible to explain imagined colours without supposing this element in the sensation to be reproduced? If it is, this would partly account for the weakness of the image. Let us go through the list of possible responses and see what each can offer. The reaction of attention in looking at a tree is different from that in looking at a pebble, and this reaction may therefore help us slightly to imagine the tree as green and the pebble as grey. Our practical reaction to objects—the movements we select for dealing with them—is partly determined by their colour: and tendencies to make the same movements may therefore help us to identify the object and so think the colour. Thus, we may be aided in imagining the sun by a tendency to contract the eyebrows

be either for looking at the bottom as near and at the top as farther away, or *vice versa*: and the two alternative visions are therefore due to these prepared adjustments, with the motor sentience and kinaesthetic sensations that accompany them.

and to look soon away, as we have to do, in order to shelter the eyes, in looking at it. The different colours, again, have different emotional effects—red being notoriously exciting, white being cold and black suggestive of night and wickedness, yellow glorious (as appears in the value set on gold), and green tranquillising (plants being such harmless creatures). These various effects are produced in us by the varying action of the colours upon heart-beat, breathing, secretion, and other bodily processes; and if, when a colour is suggested, the emotional reaction originally due to vision of the colour is called forth, this may help us to think of and suppose we inwardly see the colour. That associative responses may serve to fix the colour imagined, goes without saying. Again, in imagining tones (these are my own most lively images)—*e.g.*, in repeating a melody to oneself inwardly—it is possible that the pitch of each tone is mainly fixed by motor and organic reactions.

This way of accounting for imagined qualities may be valid as an explanation of faint ideas of them, even if extravagant as a theory of vivid images. In the latter rôle it seems to be contradicted by the testimony of persons who have these, and by everyone's experience in dreaming. Yet dreaming is of all cases the easiest to explain in the suggested motor way. Dream-images are largely sensations proper, due to external stimuli or (as in nightmare) to irritating substances in the blood circulating through the brain; we usually apperceive them in terms of

the experiences of the preceding day, by means of the most recently formed habits ; they have a great vagueness ; our judgement is at its least critical point, and it would be trusting too much to this judgement to say that the colours are really reproduced. On the other hand, it is possible that qualities depend on connexions between elementary nerve-processes—on the various possible combinations of nerve-impulses in space and time—and, if this is so, there is no reason why they should not be reproduced.

This is one of those psychological questions that cannot be settled without the help of neurology, and neurology, so far as I am aware, has given as yet no decisive answer to it. I am sensible that this account of the nature of the image is very imperfect ; but the possibilities suggested should at least make it clear that there is no good ground for opposing the image to the sensation as an entirely different kind of state. In that case its nature is consistent with the evolutionary origin of the mind.

II

Awareness of the Past and of the Future

Memory and expectation are forms of awareness requiring an image, but what is characteristic of them is the reference of the image to the past and the future. We must now consider whether our theory, which admits only present nervous processes that in their intrinsic nature are present feelings, is able to explain this reference. The motor element

in awareness will help us to do so, without assuming an ultimate power of the mind to view the past and the future.

Expectation should be dealt with first, because in it the motor element is so obvious. I saw the other day a cat intently eyeing a crevice in the wall, in which probably there was a lizard. Her attitude was crouched and ready for action—for the event she expected, or hoped for, was in the immediate future. I know not whether she had a sensuous image of the object of her hopes; very likely not—and I ought not to speak of her as really hoping. But that her motor response to what she saw or heard was addressed rather to the future than to the present, was sufficiently obvious. Let us assume that the cat expects only in an instinctive motor way, and does not imagine beforehand. We, at least, who can imagine beforehand, may feel the futurity of what we imagine by reacting in a way appropriate only to the future, just as does the cat, and feeling ourselves so react. For instance, when I hear a friend's voice and expect in a moment to see him, I have a visual image which arouses tendencies to the act of looking and welcoming, the execution of which is deferred. These tendencies, made ready in the nervous system but not yet operating, project the image into the future.

Such temporal projection is exactly analogous to the spatial projection by which an object is seen as distant. As objects are externalised by an appropriate reaction and the sense of externality lies in the feeling of the reaction, so they are thought of

as future by a preparation for future action and the sense of their futurity lies in the feeling of this preparation.

If I expect to see my friend next week, the reaction is deferred to a date fixed by associated ideas, but there is none the less a present preparation for it which is felt. Images can impress upon the nervous system a tendency to reaction at an indicated future date, as in post-hypnotic suggestion. When I expect the sun to rise to-morrow, reference of the image to the future is effected by the same motor mechanism ; but since in this case no future practical reactions are necessarily involved, it is the reaction of attention that is now made ready.

If the motor attitude characteristic of immediate expectation suffices, as I think it does, to explain all reference to the future, one more rather serious obstacle has been removed from the path of our evolutionary psychology.

If awareness of the future can be accounted for in this motor manner, it must be possible to explain similarly awareness of the past. Let it not be objected that I am making too liberal a use of the motor element ; possible reactions are infinitely various, and may be appropriate to and accurately designate all sorts of objects. There is a kind of reaction which is appropriate only to the past. It is that of reacting as if it were now too late to react. When a cat has by a hair's-breadth missed seizing a mouse, and the mouse has escaped to its hole, she behaves instinct-

ively in this way ; and we, when the opportunity for action has slipped by, may react appropriately to the image it has left behind by similar behaviour. When my friend has just left the room, my image of him is projected into the past by this sort of behaviour.

This kind of reaction is a desisting from action, as no longer appropriate or possible. If we describe the feeling of action prepared for as the sense of " not yet ", the feeling of refraining from action because it is now too late will be the sense of " no longer ".

The principle is that motor response, to be appropriate, must change completely in its character as the sensation passes over into the after-image. It would be very contrary to our interests, and to the facts of life, if we behaved towards immediately past objects and events as we behave towards present ones. This altered motor response—this enforced quiescence and renunciation of action—suffices to communicate to the after-image, and later to the memory-image proper, that reference to past time which is the characteristic of memory ; without need for the view that memory is an inexplicable power of the mind.

Bergson is doubtless right in distinguishing between habit memory and memory proper, the mark of which is this reference to the past ; but it does not follow that memory proper does not involve an element of habit. Reproduction of the sensation in the form of an image is of the nature of habit. An image, revivable repeatedly, may be described as a habit formed on a single occasion. A habit is not

the less a habit because due to a single experience—for instance, the habit of thinking that on a certain occasion I saw so-and-so. Bergson, who puts the perception in the object, is forced to put the memory-image there too and to regard memory as a quasi-miraculous function, an interpenetration of the still real past with the present. This is yet another fatal consequence of phenomenalism. But one cannot remember without a present state of sentience! If I expect the sun to rise to-morrow by means of a present image of it, why may not I remember that the sun rose yesterday by means of a present image? The reference of this image to the past will indeed be a self-transcendent function distinct from the image, and not involved in the mere reproduction of things learned by rote; but a function to be explained in the above-mentioned naturalistic way.

Thus still another capital obstacle is cleared out of the path of our evolutionary theory; and it is seen that the absolute distinctness, in Nature, of past, present, and future does not necessitate, for their apprehension, a similar distinctness of ultimate powers of the mind.

III

Awareness of Succession

When we see a man walking, or listen to a melody, or hear a sentence spoken, we are aware within each specious present of a sequence of sights or tones or words; successive things stand before us as parts

of a temporal whole, in much the same way that vision of a room shows many objects as parts of a spatial whole. No other cognitive performance seems at first so clearly to require a mysterious power of mental vision as this direct apprehension of the immediate past and the present in their continuity. Yet, on our principles, it must be explained wholly by means of present reactions to present feelings. A change of consciousness, as James truly says, is not the same thing as a consciousness of change. I must try to show how the feelings left behind by a sequence can make us aware of the sequence.

The sequence of which they make us aware may be a sequence of events in the outer world ; say, a sequence of sights. When the electric light suddenly goes out, how do we become aware of the change from light to darkness ? (1) Along with the sensation of darkness, we have in us an after-sensation of the light : but these, when projected, do not suffice to explain the awareness of succession—for they yield only an immediate memory coexisting with a perception. (2) In passing from the light to the darkness there was a change in our motor adjustments—for we perceived the light by being prompted to one sort of response, and perceive the darkness by being prompted to another different one ; there has therefore been a motor transition, which has left in us a tendency, when we imagine the light, to pass in thought from it to the darkness. In other words, an association between the imagined light and the seen darkness has been formed. This motor tend-

ency, remaining in us in the form of a physiological connexion or associative tie, is perhaps the most essential factor needed for explaining the awareness of succession. It enables us to intend the relation of succession. As we intended the light by means of one reaction and intend the darkness by means of another, so we can intend the passage from light to darkness by means of this permanent motor tendency. (3) We experienced the passage with a sort of shock, caused by the sudden change in our motor adjustments; this change was felt in the form of a kinaesthetic sensation, more acute than those due to the initial and to the final adjustment; the acute kinaesthetic sensation is now in us, along with the after-sensation of the light and the sensation of darkness.

A visual transition leading to coexistence of an image with a sensation, a motor transition leaving behind a permanent motor tendency, and a kinaesthetic transition resulting in an acute sensation—these, then, are the elements out of which we have to construct the awareness of succession. This awareness arises by our reacting, at the conclusion of the experience, to the light, the passage from it to darkness, and the darkness, as parts forming a whole.

We can now be aware of the sequence in either of two ways. Either we attend to the remembered light, and are led by the permanent motor tendency to pass in thought from it to the darkness—in which case we are aware of the sequence by repeating it internally; or we attend only to the present state of things, by means of the sensation of darkness

modified by the after-sensation of light and the acute kinaesthetic sensation, and these last, in virtue of the permanent associative tie, serve as a symbol bringing the succession before us as a meaning not thought out. We cannot think what we mean by the relation of succession, except by actually repeating the sequence in imagination—by becoming aware of it in the first way.

This scheme of explanation can be applied with slight modifications to the more complex experience of listening to music. It is necessary to state the problem in the simplest possible form, without entering into the intricacies of the subject (of which I confess that my knowledge is non-technical).

Suppose we hear a musical phrase consisting of four or five successive tones. How can we, when the phrase is completed, have that sense of surveying it as a whole, that awareness of many successive tones bound together by relations? For the earlier tones are past and no longer heard, and all that we actually hear is the present tone. Four things have here to be considered: the after-effects left behind by the preceding tones, the reactions set going by these tones when heard, the motor transitions which have bound them together, and the emotional effects produced.

(1) A tone which has just sounded leaves behind after-effects, either in the shape of after-sensations or, more probably, in that of nervous dispositions which yet have their effect on the datum before the mind. We cannot say that the succeeding tone is modified in quality, for it is heard with its true pitch and

timbre. But, owing to the after-effects, each successive tone is heard with an accompanying quality, different according to the tones that have preceded, and this quality, gradually emerging as the tones succeed one another, is attributed to the total phrase. (2) Each tone, as it sounds, evokes a reaction of attention, and the reactions thus set going overlap upon the succeeding tones. (3) These reactions are bound together by successive motor transitions, which persist in us as physiological connexions at the moment when the phrase is completed. (4) Each tone as it is heard produces emotional effects due to its own quality, and the motor transitions, *i.e.* from a tone to a higher or a lower tone, also have their emotional effects; and these emotional processes continue up to the end of the phrase, and are then felt at their height.

Thus at the moment when the phrase ends we have in us an exceedingly complex process, at once nervous and psychical, the parts of which are so connected with one another that they form an orderly system. The mind, as we say, has combined the tones into an ordered whole. This orderliness is not the same thing as musical harmony, but is necessary to our feeling it. How far is our enjoyment of music due to mere purity of tone? How far to the facility with which the mathematical relations between the tones permit combination to be effected—for ease of nervous combination and absence of thwarting, the gratifying of the intellectual impulse, is certainly a source of pleasure? How far to the interest of pure form, and the heightened interest of form into which there is introduced

an element of novelty ? How far to the direction and distance of the auditory and motor transitions—to those “intervals” which, with rhythm and pace, enable music to express and excite emotion, and so give to it what, to most of us, is its greatest charm ?¹ These are questions for the aesthetic psychologist, on which I do not venture to express an opinion. It is sufficient to say that, at the moment when the last tone sounds, all these various factors are gathered up into a single complex state of sentience with an equally complex conjoined reaction, and that the object which these, together, bring before us *as a meaning* is the total phrase we have just heard. We can translate the meaning into the thing meant by inwardly repeating the phrase.

This naturalistic analysis, I cannot help thinking, is the true account of that awareness of many successive tones as forming a whole which we have in listening to music. Its merit, for the purpose of our evolutionary undertaking, is that it explains the sense of sequence and the quality of the total phrase without making use of any feelings or reactions except present ones.² All the elementary

¹ We may suppose that in the earliest times uncivilised peoples were accustomed on special occasions to relieve their pent-up feelings by outbursts of joy and grief, wailing or singing and dancing ; and that the appeal which music makes to us to-day is a last refined product of this inherited instinct. Its substance is a *κάθαρσις* of the emotions—it is literally a “purging” (cf. Aristotle on tragedy).

² Bergson, in *Les Données immédiates de la Conscience*, pp. 76-77, has given an analysis of the sense of sequence in music which, while subtle in point of observation, is vitiated by his use of “interpenetration” to explain it. The notion of interpenetration, as I have shown in the last essay, arises by attributing to the real what is true only of the

phenomena of music are accounted for by the co-operation of present tones with the present after-effects of preceding tones, and without supposing a magical power of looking back. The power of looking back is real, but it is not magical, since it depends on a present response called forth by present sensations.

Our ability to understand sentences is an even more difficult case to discuss, because here we have to do not with mere sensations used for awareness of objects, but with word-sensations used as signs of images and through these signifying the objects, so that the case is more complicated ; and also because of the number of successive words that may be seized at once and apprehended as one significant whole. Moreover there is here not mere fusion, but discriminative apprehension—as indeed there is also in listening to as distinguished from merely hearing music.¹ The understanding of sentences is analytic. How do words, each with its own meaning, manage to persist in consciousness so long ?

They can do so because each word, with its meaning, is a motor as well as a sensory process, and because the motor processes are only *tendencies* to reaction, not completed reactions. This last is a matter that has not yet been made sufficiently sense-datum. There is no real interpenetration of the past with the present—the past *is* past, and no longer real. What is present and real is only its after-effects, and these are quite distinct from the past itself.

¹ A convenient distinction made by Vernon Lee, whose forthcoming book on the appreciation of music, *Listeners and Hearers*, will, I hope, not be long delayed.

clear, and the present is a good opportunity to explain it.

Vision, as Sherrington has pointed out, is essentially "anticipatory"—that is, it arouses tendencies to reaction which are not at once executed.² The tiger who sees an antelope in the distance cannot yet seize and crunch it, but must hold these reactions in readiness until the moment of fruition arrives. In the same way, when the servant tells me that a friend is at the door, I cannot yet seize his hand and greet him. Here, then, are incipient motor processes sufficiently prolonged to account for my understanding the servant's words—and for many other psychological facts besides. Since the act can be thus held in reserve, and since, on our theory, a tendency to action is that which gives reference to an object, the idea of the thing with which the act is concerned—the tiger's idea of the antelope, or a man's idea of the meaning of individual words—can continue in the mind for as long as the act can be held in reserve.

² Sherrington, *Integrative Action of the Nervous System*, pp. 326 f. Cf. Pierre Janet, *L'Évolution de la Mémoire et de la Notion du Temps*, pp. 230-31: "Le passage des réflexes prochains aux réflexes lointains implique une transformation de l'action. L'action, primitivement, était simple; elle était stimulée, et puis elle se déclenchait tout entière; c'était une sorte d'explosion que l'action vitale. Mais pour que le réflexe lointain pût rendre un service quelconque, il a fallu que l'explosion fût retardée et les actes se sont transformés. Ils se sont divisés en deux phases: la phase d'érection de l'action et la phase de consommation de l'action. Au moment où un animal sent dans le lointain une proie à consommer, il ne faut pas qu'immédiatement il fasse l'acte de manger, car il ne mangerait rien du tout; il faut qu'il maintienne cet acte dans un état particulier de tension et qu'il arrive jusqu'à la proie. En un mot, le passage de réflexe prochain au réflexe lointain est l'invention d'actions toutes nouvelles, c'est l'invention des actions suspensives qui caractérisent pour nous la perception."

And the man, since he understands the meanings of the individual words, can combine his reactions to them individually into a single complex reaction, by means of which he will understand the meaning of the entire sentence.

IV

Awareness of Other Relations

In listening to a spoken sentence, the words are heard as successive, but their meanings may bring before us any time or any place. The relation that binds the meanings together into a total meaning may be any sort of relation. Now I think I may take it for granted that thought is everywhere a matter of conceiving relations or of passing from one relation to another. If, therefore, I show that our theory of awareness can satisfactorily explain awareness of certain simple relations, such as space and time relations, the relation of whole and part, similarity and difference, I shall have proved that it is capable of explaining the most complex thought.

A motor transition leaving behind an associative tie seems specially adapted to explain awareness of succession, since it is itself a successive process; but can it account for awareness of the other relations mentioned? Let us first take up spatial relations.

The relation between the meanings of successive words is the relation between things which the

sentence formed of those words expresses—as when I say, the bookcase is to the right of the table. As the table is seen by means of one motor adjustment and the bookcase by means of another slightly different one, so the spatial relation between them is seen by means of the alteration of motor adjustment, or movement of attention, necessary for looking from the table to the bookcase. Since throughout this motor transition attention is fixed on the objects, not on our eye-movements, and since the bookcase was marginally seen at the beginning and the table is marginally seen at the end, the relation perceived is not one of succession but a simultaneous relation between two permanent things. We have perceived their *total* spatial relation—direction and distance together ; and these can be separated from each other only by abstraction—that is, as a result of comparison with other cases similar to this in the one respect or the other. The total spatial relation is thought of, in our absence from the room, by repeating mentally the before-mentioned movement of attention. When thus thought of, it constitutes a *judgement*, or at least a *proposition* : a proposition not being in its essence a form of words, but a relation thought of and perhaps affirmed. We must distinguish between real propositions and verbal ones.

Thus the conclusion to which our analysis leads is that in the brain there are complexes of nervous processes which are the correlates of real propositions, and other more complicated complexes which are the correlates of verbal propositions. It is these

latter complexes that are interfered with and rendered impossible in aphasia.¹

Time-relations have already been dealt with, and I pass to the relation of part and whole. When, after looking from the table to the bookcase, we view them both at once, our passage of attention has distinguished them as separate objects, and they are therefore viewed together as parts of a spatial whole. The relation of whole and part is here of a spatial kind ; it is a certain sort of spatial relation. Similarly, when successive tones have been discriminated and are regarded in retrospect, each tone may become a separate object of attention and be viewed as part of a temporal whole.

In the example of passing from light to darkness, the total relation apprehended was not merely one of succession, but also one of difference and therefore of change. The special element in the situation that made us aware of difference or change was the shock with which we experienced the sensory and motor transition. For we mean by " difference " that which makes us experience the transition from one thing to another with this sort of shock. Here again it is by abstraction that the relation of succession and the relation of difference have to be separated from each other. When we looked from the table to the bookcase there was a small element of shock ; but since these objects are permanent things, the differ-

¹ That in the brain there are complexes of nervous processes corresponding to propositions is the theory of Hughlings-Jackson, elaborated in detail by Head in his great work on *Aphasia*.

ence perceived was not a successive but a simultaneous and permanent one.

When we look from one light to another, we experience the change not with a shock, but with something analogous to the feeling of familiarity. Our motor adjustments have been altered in so far as we are now looking in a different direction, but in so far as the new object is another light our motor reaction to it is the same. Thus, in this case as in the others, the particular character of the motor transition and subsequent adjustment suffices to explain our awareness of the particular relation—here the relation of similarity.

In this analysis I have made some use of *attention*, and a word should here be said about it that has perhaps been too long deferred. In the preceding essays I spoke repeatedly of attention as if it were solely a matter of adjustment of the sense-organs, with the cerebral processes necessary therefor. While this is the original source out of which attention has been developed, and it remains to the end a sort of tension, of course it has another side—even after heart-beat, vasomotor reactions, and the influence of hormones have been duly considered. Human attention consists largely in inhibition and reinforcement by ideas—that is, by nervous processes co-operating with the nuclear one and assisting it either by exclusion or by inclusion.¹ When we concentrate our attention, all the relevant contents of the un-

¹ On this, see Sherrington, *Integrative Action of the Nervous System*, p. 234 and *passim*.

conscious self are brought to bear upon the matter in hand. It is this latter kind of attention that permits us to think of abstractions, and to distinguish from one another the different kinds of relations. But there is nothing here that is not completely expressible in terms of simultaneous and successive nervous processes working together for a vital end.

If the foregoing analysis satisfactorily accounts for our awareness of the most elementary relations, our theory will be able to account for all the facts of human speech and thought, since these consist only in awareness of more complicated relations. In discussing these high matters I have dealt only with the simplest facts involved, on the principle that if the pennies are cared for the pounds will follow of themselves.

V

The Psychology and the Logic of Ideas

In considering the relation of thinking to the brain, the great difficulty is to understand how the logical connexions between ideas and the causal connexions between nervous processes are consistent with each other. The latter imply causal connexions between ideas, and it seems at first sight as if the relations of ideas must be either logical or causal, but cannot be both. Nowhere does our theory of awareness show itself more efficient than in solving this problem. It permits us to reconcile completely the psychological relations between ideas, which must be causal, with

the logical relations which are necessary to their conveying truth.

It can do this, because it distinguishes the thought from the thing thought of. From the outset of awareness in perception, we have recognised the distinctness of the percipient state, and therefore of the perceptive act, from the real thing perceived and brought before us as an object. What is causally connected is the states of sentience with their conjoined reactions; the objects given, when a relation is perceived, are not connected causally, except where the relation perceived is a causal one, but by those relations of space and time, similarity and difference, with which mathematics and logic deal. When relations are thought of, the situation is the same.

I have said that the states of sentience are connected causally; but this is true only to the extent that the nervous processes are so connected. The successive states of sentience by means of which we perceive, for example, a moving tram are *not* causally connected with each other: each state of sentience showing a position of the tram is an effect called forth in us by the tram in that position; thus my percept of the second position of the tram is not caused by my percept of its first position, but by its actual second position—the successive cerebral events are so many side-effects of a process going on outside the body. The causal relations that bind together the tram's different positions are therefore perceived by means of nervous processes and states of sentience that are not causally connected

inter se.¹ This example shows how free we are to perceive and to think solely of the logical relations.

When we think of the moving tram, the nervous processes and images by means of which we think of it *are* causally connected : for they are successively called up by association. The motor transitions have left in the brain and the self a series of associative ties. But these ties in us permit us to think of the objective relations. The causal connexions between our thoughts are therefore no bar to our conceiving, and conceiving truly, the spatial, temporal, and causal relations between the objects of which we think. The associative ties, as we have seen, enable us to intend the objective relations, as the reactions to each external phase enable us to intend the objects. Thought deals everywhere with the intended. Association is not that fortuitous and arbitrary conjunction which it is sometimes imagined to be, but always rests on relations. "Contiguity" means contiguity in space or time ; "similarity" is even more obviously relational.

Similarity is the bond which holds classes together ; and the associative tie left behind by a transition between similars, the habit of reacting similarly in each case and thinking of the other cases as similar, may therefore be the means by which we intend classes. If a white cat has three white kittens, their

¹ This situation might be taken as a proof of Hume's thesis that we perceive only uniform sequences. But since it also demonstrates the necessity of distinguishing between the perception and the thing perceived, it shows that, despite the foregoing, the real external relation may be one of "generation".

similarity in shape, size, colour, and relation to the cat may lead us to think of them as a little family, in which each kitten has the relation of part to whole. This is one of the pennies which may result in the accumulation of many pounds sterling in the bank of abstract thought.

The thought of "man in general" may have as its sensory element the vague image of a particular man ; but what we intend, in the way above described, may be the entire class of men. When we say, "Socrates is a man", the thought expressed by the last two words is of this description. This analysis of abstract ideas shows that Berkeley (who perhaps had vivid visual images) was wrong when he said that we could not have the idea of a triangle which was neither right-angled nor isosceles nor scalenon : he was omitting to consider the motor element in thinking, as his entire school habitually does.

What makes association appear inadequate as the fundamental principle underlying thought is the fact that systematic thinking is guided by a purpose. What is a purpose ? It is a conceived end, held in mind and used as a standard, to decide whether the means that suggest themselves really conduce to it. It is a task or problem, possible answers to which occur to us, until an answer is found that fits. The thinker may set the problem to the unconscious self, but the unconscious self must, by association, supply the answer. In trying to think of a forgotten name, the image of the person and the desire to utter his name set the problem, with the final result that the name

issues in consciousness. It is not otherwise when we try to think what is the sum of $17 + 29$, or what is the sum of the three angles of a right-angled triangle. There is evidently nothing here not completely explicable in terms of associated nervous processes with correlated states of sentience.

Thus our recognition of motor activity as the basis of intent enables us to deal successfully with thinking, and to reconcile its logic with its psychology. The thesis that perception and thought are alike concerned with the intended does justice to the spirituality of awareness—its difference from any purely mechanical process of cause and effect—yet without denying the obvious fact that both these functions have mechanical processes in the body as their correlates. Our thought could not be subject to such variations in consequence of bodily states, being smooth and easy when we are fed and rested, and full of difficulty when we are tired or ill, if this correlation were not thoroughgoing. No offence, therefore, should be taken at a theory which would explain all thinking by means of connexions between processes in entire sensori-motor arcs.

Thought is a large subject, and I have touched in this essay only on certain aspects of it. Our concern was mainly with its psychology, and this has now been sufficiently discussed. But I may take this opportunity to point out the bearing of our results on some ultimate problems of logic and epistemology.

1. *Forms and the Platonic Doctrine of Ideas.*—Forms, or “patterns”—the name is new, but the idea is as old as Plato—are evidently sums of relations, and especially such sums as constitute a simple and apprehensible whole; and they are apprehended in the way above described for relations, not by mere perception but with the assistance of thought, yet in what is sensibly perceived. Thus we can say that we *see* a circle or a square—or could say this, if we ever saw a perfect one. It is these formal elements in the real which Plato called “ideas”, and regarded as more truly expressing its being than sense-data, which when predicated of the real yield mere “opinion”. If it be borne in mind that sensible qualities, assuming our account of their genesis by simplification to be correct, are, so to speak, concealed or confusedly apprehended forms, and that forms, as they exist in the real, are infinitely distinct and precise, being arrangements of different intensities of energy or sentience in space and time, it will be seen that our analysis of knowing bears him out in this opposition of the real to the sensible. If, further, it be recalled that a sense-datum, taken in abstraction from its use in perceiving and considered in itself, is an “essence” or universal, which may recur at innumerable times and places, and that consequently, when the sense-datum is a discriminative one showing a form, the same is true of this form, it will be seen that we recognise the nature of intuited forms as universals, and can assent to Plato’s doctrine of ideas at least to the extent of admitting that forms

truly express the habitual manner of constitution of the real.

That form is *more* real than matter—that is, than energy or sentience—or that it exists separately from the matter which has the form except when it is an idea before the mind, we cannot admit. Forms are not agents. It is matter in which all agency resides.

To what then do forms owe their special importance in ontology? To the fact that things having certain kinds of forms are, thanks to these particular forms, self-maintaining—*e.g.* animals and plants, atoms. This is apt to suggest the notion that it is the form, acting independently of the matter which is in the form, that maintains; but this is an error. Forms have no causal action; it is the smallest parts, when they are in that arrangement, which by their action cause the atom or the animal to remain in being.

Basing our view on the analysis of spatial and temporal continuity given in a previous essay, we may say that things which maintain themselves in consequence of their forms come into being in the following way. (1) In Nature everything is always “on the go”—the energies in points, being potencies, are continually operating. (2) Things go every possible way—inorganic Nature is the domain of chance, in a sense of this term in which it is not opposed to causal action (think, for instance, of the weather)—and consequently create all kinds of forms. (3) Some kinds of forms are self-maintaining—*e.g.* the forms of atoms, or those of living beings. (4)

Hence forms, though not causal, are, if I may so say, consequential.

To attribute agency to a form is as if one should say that a house remains standing, not because its bricks when vertically arranged support one another, but through a mysterious force exerted by the plan of the architect. Especially in biology is it easy to commit this fallacy. Thinkers of vitalistic leanings seem to me in danger of committing it when they talk of a "unifying principle", a "control of the parts by the whole". These expressions may be harmless, but they suggest a failure to distinguish between the view that forms are causal and the view that they are only consequential.¹ The latter view allows to "organisation" or "co-ordination" the importance to which it is entitled, without committing the error of supposing that form can act upon matter.

It is another instance of the same error when we are told that a whole is more than the sum of its parts. This is true only if, by "the sum of the parts", we mean the aggregate of parts without the relations connecting them: if we include these relations, the whole is *not* greater than the sum of the parts with their relations, but exactly equal to it. Analysis is complete resolution.²

¹ I can imagine a mode of control of the parts that might be the key to organic development and may possibly be that element in the facts which vitalists have in mind. The nervous system is obviously the great means of control. Does the incipient nervous system, as fast as it arises, exercise a directing influence over the parts of the embryo, so as to cause them to develop in a certain manner?

² This has been neatly pointed out by Prof. Harold Chapman Brown.

Forms, then, exist in the real only as particular combinations of the matter or sentience in points connected by simultaneous and successive junctions, and owe their habitual recurrence ultimately to the nature of space, time, and energy ; three things which, wherever found, are always alike. It follows from this that, in the real, exact similarity is what is meant by " sameness " (except in the case where the same thing is cognised from different points of view) ; and that essences, universals, or forms have a sameness that cannot be said to be exact similarity only because, as possible ideas, they are " out of space and time ". But these ideas would never have arisen as such, if there had not been thinking beings ; and all that would then have existed would be the exactly similar things in Nature. The world does not come out of ideas, but ideas come out of the world.

2. *The a priori in Plato and in Kant.*—Plato was led to his doctrine of ideas largely by Pythagorean considerations ; among the entities most prominently in his mind were the geometrical and arithmetical essences, by considering which we are able to construct for ourselves the propositions of mathematics. Our ability to do this in advance of experience (or on the basis of very little experience ?) seemed to him to imply that the mind has an inborn constitution, which is a surer guide to truth than sense-perception.

Since, on our hypothesis, the self or soul is in space and time, and owes to this its power, by reacting suitably, to perceive objects as in space and time, and later, by abstraction, to think of space and time

as they really are ; and since presumably this power is not all acquired through experience after birth, but also rests on an innate tendency to perceive and think thus which Nature has gradually built up in animals, we must assent to Plato's view that our mathematical ideas are in large part inborn or *a priori*. His doctrine of "recollection" is a poetical way of expressing the fact that we bring with us from Nature the power of understanding her. It does not involve *our* pre-existence.

This is the theory of "innate ideas" which Locke misunderstood and attempted to refute, and which reappears, in a somewhat questionable form, in the apriorism of Kant. For Kant, in the desire to establish on a firm basis the truth of mathematics, was led into the vagary of supposing that the innate constitution of our minds does not merely assist us in understanding Nature, but actually imposes upon the raw materials of sense the "forms", as he called them, of space and time : only the sensory materials being passively received, but the forms of space and time actively contributed out of the resources of the mind. In truth, reaction is requisite as well as passively received sense-impressions for the intuiting of sensible qualities ; and, on the other hand, the spatial and temporal forms of things are passively imprinted on the sense-organs and brain, and therefore on the self, before they are projected and transformed into sense-data showing the place, size, and sequence of objects by the reaction. Had Kant recognised that form and matter both are at once passively

received and actively produced, our passive reception of form would have prevented him from supposing that space and time are purely subjective, and concluding that the real is unknowable.¹ Thus the greatest error in his philosophy would have been avoided.

Kant's idea that our knowledge requires criticism—that, before making use of common-sense principles, we must, in his words, “ask in what way reason has come into possession of them, and by what right it employs them”—was a sound idea. If he failed in his critical undertaking and ended with a declaration of our necessary ignorance which, to use his own terms, was not criticism but scepticism (and which authorised his successors' denial of the very existence of the externally real—for, if it is unknowable, how can we know that there is such a thing ?)—if, I say, Kant's criticism ended calamitously, it was because he had not the advantage of the light thrown on perception by physiological psychology. The physiological facts connected with perception show clearly that the “spontaneity” involved is not an activity merely of the mind, but at the same time a reaction of the body ; this is unintelligible unless we suppose that the body is dealing with real things outside it, and that the self, therefore, is a part of Nature, and in space and time ; the physical relation between nervous processes and external objects then becomes a means of estimating the degree to which the perceptively apparent reveals the real truly. Thus the “transcendental”—understanding by this term what

¹ Cf. von Hartmann, *Kants Erkenntnistheorie*, pp. 62 f.

appears and the appearing—is, as its strange name indicates, only a means of transcending and reaching the real : a means which it is the object of criticism of knowledge to purge of its element of error, so that the true nature of the real may be securely known.

Epistemological criticism has for a century past been mainly logical—ignoring the physiological conditions of acts of cognition as relatively unimportant or even as quite irrelevant. This was a consequence of the prevailing phenomenalism : which supposed the only accessible object to be immediately given to an infallible acquaintance, and “knowledge” to consist exclusively in logical passage from this to other objects. If, on the contrary, the earliest object (whether external or internal) is known only by the use of feelings as signs, and this use of them is instinctive, the true criticism of knowledge will not be an anxious scrutiny of inferences, nor yet a perfectly accurate analysis of data (however important both these things may be in their places), but will lie in a careful study of the physiological and psychological conditions on which knowledge by acquaintance depends. If we do not pass to the real by reasoning but by instinct, fundamental criticism cannot be logical, but must be psychological.

VII

THE ONE AND THE MANY IN PSYCHOLOGY

WILLIAM JAMES somewhere says that the problem of the one and the many is the most fruitful way of approach to the fundamental issues of philosophy. This problem arises also with regard to the mind, and psychology and philosophy are here very closely connected. It will be convenient, in considering it, to distinguish between the mind and the soul. Our evolutionary psychology is a psychology *with* a soul—that is, with a self whose nature is sentience. Giving this meaning to the term “soul”, we may use the term “mind” for the totality of the self-transcendent functions by which the soul is aware of and deals practically with its environment, and also with itself. The question, then, which I propose to discuss in this essay is whether each of these things is one or many, and in what sense.

Information on this point can be obtained only from certain sources, and it is important we should make clear to ourselves at the outset what these sources are. They are the forms of knowing by which our knowledge of sentience and of awareness is gained: in the case of sentience, introspection,

and in that of awareness, reflection. Only the soul can by direct experience be *seen* to be either one or many ; our conclusion in regard to awareness must be an inference from the circumstances of reflection. For awareness, as James has shown, is an external function, and therefore not a possible datum of experience.

If in awareness there is anything that is one, not many, it must be the individual act. A mental act, whether we think of it concretely, as an act of perceiving, remembering, expecting, conceiving, willing, or abstractly, as an act of mere awareness, is always a functional relation joining sensations (original or reproduced) with that which they signify and enable us to intend, or, in the case of will, to accomplish. Such an act is by its nature unintrospectable : for the reason that the self which performs it is, at the moment of performance—the only moment at which introspection of it would be possible—exclusively occupied with what is perceived, thought, or willed, and cannot, at the same time, have the act of perceiving, thinking, or willing before it. This is as impossible as it is, at the moment of grasping an object, to grasp also the movement of grasping. The act in question, moreover, is not a sort of thing that can be brought before the self sensibly, as an outer object or a sensation can ; for it is (to use a metaphor) a leap of the intellect, a self-transcending arrival at the object without passage through space or time. Even the word “ act ” as applied to it is a metaphor.

To those who imagine that everything psychical

is sensible and introspectively verifiable, this notion of a mental act will seem to savour of dualism if not of mysticism. But no non-natural or magical power on the part of the mind is here intended. Such an act is only that undeniable relation or function by which, wholly through the operation of natural processes, we are able to look forward into the future or outward at things distant or backward into the past. Our ability to perceive, remember, and expect is no more mysterious or naturally inexplicable than our ability to aim a gun at an object and discharge it with effect. Both powers rest on the same continuity of natural processes in space and in time, and the description of them as powers is merely a condensed statement of what in fact occurs.

How, then, do we learn that such acts have occurred? When, a moment after having perceived or willed, we become aware of our perceiving or willing, what we observe introspectively is only the visual, auditory, or tactile sensations that were the vehicle of our perceiving or willing, and the kinaesthetic sensations reporting the reaction that clothed the former sensations with meaning or enabled them to produce an external effect; we then, by reflection, infer the external relation or function which this entire complex of sensations must have had, in order to bring before us the object perceived or to effect the end willed. We are able to infer the act with as much certainty as we infer the projection of the bullet from a gun, a projection which no man has ever seen. What we can observe, as James rightly asserts, is

only the kinaesthetic sensations accompanying awareness or will.

Thus the denial that mental acts are observable in no way involves the denial of their reality, or of their importance for psychology. James would have expressed the truth more exactly if, instead of denying the existence of "consciousness" (the inverted commas indicating that he refers to a certain false notion of it), he had denied that consciousness is an existent. He does, indeed, say distinctly that he retains consciousness as a function ; but he gives a very imperfect account of the relations in which this function consists, omitting mention of the rôle of the motor response in clothing the visual or other sensations with intent, and of the part played by the kinaesthetic sensations in making us feel that we intend. None the less, James's recognition that consciousness is not observable and that only the kinaesthetic sensations are so is a most important advance, entailing consequences in psychology and in philosophy the full extent of which will only appear with time.

The consequence that immediately concerns us is that, if awareness has unity—and there can be no doubt that it has—the fact cannot be known to us by direct observation.

I

The Unity of Awareness

How then do we conclude, from the facts that are observable, not only that an act of awareness

has occurred, but that it has unity? And what exactly do we mean by this unity?

What we observe, and note as involving unity of the awareness, is the fact that the object of which we are aware (the thing as it appears) is a *whole*, the parts of which are bound together by relations. The visual field at any moment is an example of this. Since all the parts of this field were present at once, in their relations, we conclude that it was given to a single act, which had unity. This act is single or one in the same sense in which the physical act of grasping an object or accommodating the eyes to an object is one—though so different from any physical act in its spiritual nature.

But in choosing as our example of awareness one where it shows parts forming a whole and bound together by relations, we are taking an advanced case of this function such as occurs in human vision, and we ought to begin with the simplest possible case—say, that of the newly hatched chick who sees for the first time a grain of corn. Here there is no awareness of parts or of their relations. The chick's sense-datum, which he uses as a predicate, comes into being by the unification of a considerable sum of sense-impressions, which he uses unitedly as the sign of an external thing. Here, then, is the original unity of awareness—a unity which will be found to persist even in human cases involving the greatest amount of discrimination; and it is clearly seen to consist in the oneness of the act by which a sum of sensations is used as a sign.

There is such unity just as much in the chick's first purely instinctive act of awareness, by which he sees a grain of corn or a caterpillar and is led to peck at it, as in subsequent acts where the experience he has acquired leads him to refrain from pecking at the caterpillar and to peck only at the grain of corn. His seeing is now, as the phrase is, "complicated"—complicated because determined not by instinctive tendencies alone but by these in combination with acquired ones; and his perception is now "perception" in the sense which traditional idealistic philosophy is forced to regard as the only one—the sense of interpreted vision, hearing, and touch. For the idealist all perception is apperceptive; and the only unity of awareness the idealist can recognise is the "unity of apperception". But the thorough-going realist must hold that apperceptive awareness is only a complicated case of perceptive awareness—a case in which the present perception is made more intelligent by being eked out with previous perceptions, all these perceptions being of the same character, as so many apprehensions of the real: and that the true unity of awareness, therefore, is not the unity of apperception but the unity of apprehension, exemplified in the chick's earliest act of vision.

Now let us consider somewhat more fully the account which our evolutionary psychology is able to give of the nature of this unity. It involves, first of all, attention. Attending, as we saw in the last essay, is a sort of response consisting primarily in

adjustment of the sense-organ. This adjustment is necessary—in vision, for instance—to our getting the particular visual sensations at all; but also because the first glimpse does not show us with sufficient definiteness what the object is. The stimulus must act for a certain short length of time before it can call forth a fully developed process in the sense-organ, and before this can elicit the response appropriate to it: the object which has caught the attention must therefore, through its symbol, the impression or sensation, evoke first of all a circular process, of ingoing currents to the centres and outgoing currents to the muscles used in attending, by which the being of the impression or sensation is prolonged—prolonged without change, until the nature of the stimulating object has been grasped. This is evidently the nature and *raison d'être* at least of sensory attention.

It will presumably be also the nature of attention in thinking, in so far as thought needs to have sensible or imagined terms with which to operate. But *passage* or movement of attention from one term to another will be a different matter; and so also will the combination of different objects of attention into one, by what is called “mental synthesis”. Passage of attention is guided by the instincts or acquired tendencies incorporate in the structure of the nervous system—the same that led us to select one among many simultaneous stimuli as our special object of attention. We turn our attention next to what “interests” us.

As the single object of attention is such because it elicits a single reaction, so objects of attention are combined into one when they can unitedly elicit some one preformed, or now for the first time formed, reaction. In either of these cases, it is not an isolated part of the nervous structure, acting by itself alone, that determines the reaction, but appeal is made, and with more completeness according to the degree in which we are awake, to *all* the relevant motor tendencies: so that it is *I*—the entire self of each of us—that reacts, and in reacting expresses his native or acquired character.

The unity of apprehension is thus seen to be fundamentally a unity of attention. The feeling of attending consists mainly of the muscular sensations reporting the reaction by which we accommodate the eyes, hold the head in the position required for seeing, limit or suspend respiration, etc.; but it may also contain an element due to the central processes involved, a feeling ordinarily little prominent, but becoming prominent in nervous fatigue. It is the co-operation of all these sensations, the co-operation of eyes, brain, and muscles to make the object distinctly seen, in which the unity of sensory attention consists.

But attention in human beings is far from being solely sensory or muscular. From the moment when interpretation in the light of previous experiences begins, associated processes have a hand in determining the attentive act, and the number of co-operating processes becomes ever greater, until in

the highly educated man it is enormous. In every act of wide-awake attention appeal is made to the entire man, so that all the fruits of his experience may participate in determining his mental acts. They do so partly by reinforcing and partly by inhibiting. Attention ceases to be purely sensory and becomes largely intellectual. But the muscles still continue to contract as in sensory attention—as we see from the sense of strain and fatigue after prolonged concentration—and the mechanism of attention remains the same as when, in the lower animals, this function is purely or mainly sensory. The account of the unity of attention given for the latter therefore still holds good.

In what sense, then, may an act of attending or apprehending or apperceiving be said to have unity ?

The word “unity” is used loosely in much current writing, without clear perception of the two distinct senses which it may have—namely, (1) *simplicity and indivisibility*, (2) *wholeness*. These are two very different things. The unity of that which is simple and indivisible is absolute, since it possesses no parts into which it could be divided. A point, an instant, a unit of energy or sentience are examples of this kind of unity. The unity of a whole is relative to the mind that contemplates it and momentarily considers so much and no more together: as when we perceive a circle or see at once the entire visual field. Thus we may say that the first kind of unity is *real*, because it is a real simplicity and indivisibility in the thing, and the second kind *ideal*, because what

is one is only the act of mind by which the thing is contemplated.

What is said to have "unity", when this term is used in the second sense, is only a whole composed of parts that are bound together by relations; and the unambiguous name for this kind of unity is therefore "wholeness". In the simplest cases of this sort, the relations join the parts together into a recognisable form, such as a circle or the body of an animal. It might indeed be argued that a circle is indivisible, since separation of its parts destroys the circle, and an animal still more so, since cutting off his head makes him cease to be a live animal. But the fact that the circle and the life of the animal can be thus destroyed shows that really they are wholes composed of parts, not simple and indivisible units. Their wholeness indeed is real, not made by the mind, but it *is* wholeness, and not the first kind of unity.

In applying these considerations to the question of the unity of the act of awareness, we may begin by asking whether unity must be ascribed to the object of the act, as such, and, if so, which kind of unity; and then ask which kind of unity belongs to the act itself. The object given to an act of perception—the apparent thing—is the sense-datum as predicated or asserted; and the sense-datum may be simple or complex. Where it is complex, the object of the act appears at first sight to be plainly a whole, and to have that kind of unity. But how is it in the case where the sense-datum is non-discriminate and simple? Have we not here an instance

of true simplicity and indivisibility? I think we undeniably have. Moreover, when the sense-datum predicated is not simple but complex, are not the parts with their relations emergent out of a whole which still retains somewhat of the simplicity of the non-discriminate sense-datum? This seems to me probable. If so, it cannot be denied that the unity of the object of an act of awareness, even when this object is complex, is a sort of combination of wholeness with simplicity and indivisibility.

Now as to the unity of the act itself. If, by the act, we meant simply the reaction, or the sum of the processes in the nervous system, or these *plus* their spatial and temporal relations to the real thing, our conclusion would have to be that the act has wholeness but no simplicity and indivisibility. In the real there is no absolute unity short of points and instants and the operation of what is in them. But by the act we mean that grasping of the apparent thing which is effected by the co-operation of all these innumerable parts. The act is self-transcendent, a passage not in space and time to the thing intended; it is, in each case, a *single* such passage—since what it reports (if what was said at the end of the last paragraph is correct) always has simplicity; it can therefore not fail to share the simplicity and absolute unity of its object as given, the apparent thing. Philosophers, then, are right in speaking of apperception, or, as we prefer to say, of apprehension, as having “unity”, absolute unity.

But from this unity of the act it would be the

greatest of errors to infer, as its necessary condition, an absolute unity—that is, simplicity and indivisibility—of the subject of the act, the soul or self. This is as great a mistake as if we should imagine that the lantern at a cinema, because one flash of light enables it to project an entire picture, must necessarily be simple and indivisible. We could not think of many things at once if our souls were not many—if they did not consist of many simultaneous sensations, or, in other words, consist of as many parts as do the wholes of which we think. What is necessary to our being aware of many things at once is not the absence of parts in us, but co-operation of the parts.

Our propensity to think that the soul—the subject of awareness—must be simple and indivisible is due to a number of things: to the fact that we are aware of relations, to our knowledge of the subject-object relation, to the feeling of our activity in awareness, and to our sense of what may be called the *fullness* of awareness. In order, if possible, to dissipate this illusion, I propose now to show that the theory of a composite self can explain each of these features of the situation.

(1) Our awareness of relations has been dealt with in the preceding essay, and was there shown not only to be consistent with but to require the theory of a composite self. We explained it by a passage of attention, in which the first term and the particular passage are retained as images at the moment when the second term is reached, and the three are bound

together by an association. This, however, is a highly developed human function, which is not exercised when, for instance, we are aware of the visual field as consisting of parts forming a whole. The parts are *in fact* in innumerable relations, but we are not aware of the relations. Our sense that the parts form a whole may be due to that remainder of simplicity which, as it seemed to us, still persists in a complex sense-datum after the emergence of the parts. If, on the other hand, we are aware of some one or other relation, it can only be by an additional act of awareness.

(2) When, immediately after an act of vision, we become aware of the self and infer its previous existence as the subject of the act, we feel the contrast between the manifoldness of the field of objects and the unity, in some sense, of the subject who saw it. *All* these objects were present at once, and seem to have been present to a single beholding eye, the eye of the mind.

But this eye—the self—has been apprehended by introspection, and its seeming unity (when considered apart from the act) is due to the vagueness of the introspective datum, which we have seen to be a product of simplification. This eye is not in reality simple ; it could not have seen many things at once if it had not taken up their manyness into itself, in the form of many sensations ; in reality it is a field, consisting of as many parts as the field of things seen—or rather a tridimensional whole, vastly more manifold than that field. What has unity is

only the *function* of this whole as conveying that field.

(3) The sense of our own activity in seeing is fully explained by the muscular sensations reporting the adjustments of eye, head, heart-beat, and breathing without which vision is impossible. It is surely a signal merit in our motor theory of awareness to have made clear the true significance of these sensations, and thus to have transformed James's thesis that "activity" is only muscular into the proposition that the muscular sensations are a revelation of the unobservable act of awareness.

(4) By the "fullness" of awareness I mean our sense of being aware of so much—not merely of the visual field, but also of what the objects in it signify and involve, and, *inter alia*, that they involve a self who sees them. This fullness of awareness does not exist in the lower animals. We human beings, besides actually seeing, take what we see as a sign of what we *might* see, hear, touch, or otherwise come into the presence of, so that for us all seen objects are drenched in significance. Sensations, besides their *outwardly* directed significance as conveying objects now present, have also a *sideward* significance as importing eventual objects; the bond that enables them to intend these being association, and the width of possible association unlimited.

An associated object may be meant in this side-ward way without being imagined, if the object now present provokes, as a result of past experience, a reaction appropriate to the thing meant. without

this thing actually coming before awareness in the form of an idea. This happened when the child reacted to the candle-flame as a thing not to be touched—by means of a “conditioned reflex”. It happens when we hear a bell or see food. By this means the instinctive interest of the absent object is transferred to the object now present. In the nervous system what happens is substitution of the reaction to the former for the reaction to the latter. Awareness of things as full of meaning—allusive awareness of absent things—is therefore only an extension of the awareness of things now present, and to be explained on the same principles. Our theory fully accounts for it.

It seems to me that, in granting the simplicity and indivisibility of the act of awareness, and also of the datum of awareness even when this is at the same time many, but denying these characters to the self and admitting here only a co-operation of its parts, I am allowing to each of these things all the unity, and the particular kind of unity, to which it is justly entitled.

I shall conclude this discussion by comparing the account of the unity of awareness given above with the views on the subject of those philosophers whose conclusions have come nearest to my own—Hume, Kant, J. S. Mill, and Clifford.

No one of these philosophers makes the necessary distinctions between the apparent as such, the appearing or awareness, and the subject who is aware, or

recognises clearly that the first of these is given to perception (or whatever the form of cognition may be), and the third to introspection, while the second is not and cannot be given in experience at all, but is known by reflection on the combined deliverances of perception and of introspection. The inevitable result is confusion and perplexity.

1. *Hume on the Self*.—Thus Hume rightly places the being of the self in particular “perceptions”, which he thinks of as its varying states. “When I turn my reflection on *myself*, I never can perceive this *self* without some one or more perceptions; nor can I ever perceive any thing but the perceptions. ’Tis the composition of these, therefore, which forms the self. . . . The annihilation, which some people suppose to follow upon death, and which entirely destroys this self, is nothing but an extinction of all particular perceptions; love and hatred, pain and pleasure, thought and sensation. These, therefore, must be the same with the self; since the one cannot survive the other. . . . Philosophers begin to be reconciled to the principle, *that we have no idea of external substance, distinct from the ideas of particular qualities*. This must pave the way for a like principle with regard to the mind, *that we have no notion of it, distinct from the particular perceptions.*”¹

The word “perceptions” in this passage evidently fuses apparent things with the sensations by means of which they appear, thus obliterating the distinction between the perceived and the intro-

¹ Appendix to *Treatise*, ed. Selby-Bigge, pp. 634-635.

spected. If Hume distinguished the two, and identified the self only with the latter, what he says would be correct.

His next words are : “ So far I seem to be attended with sufficient evidence. But having thus loosen’d all our particular perceptions [query : loosened *simultaneous* ‘perceptions’ from one another—the sight of an object from the pleasure or pain accompanying it—or only *successive* ones ?], when I proceed to explain the principle of connexion, which binds them together, and makes us attribute to them a real simplicity and identity ; I am sensible, that my account is very defective, and that nothing but the seeming evidence of the precedent reasonings cou’d have induc’d me to receive it. If perceptions are distinct existences, they form a whole only by being connected together. But no connexions among distinct existences are ever discoverable by human understanding. We only *feel* a connexion or determination of the thought, to pass from one object to another. It follows, therefore, that the thought alone finds personal identity [it is the relation between *successive* ‘perceptions’, then, which he has chiefly in view—but the relation between simultaneous ones is like unto it], when, reflecting on the train of past perceptions, that compose a mind, the ideas of them are felt to be connected together, and naturally introduce each other.”¹ He continues : “ The present philosophy, therefore, has so far a promising aspect. But all my hopes vanish, when I come to explain

¹ Appendix to *Treatise*, ed. Selby-Bigge, p. 635.

the principles, that unite our successive [*sic*] perceptions in our thought or consciousness. I cannot discover any theory which gives me satisfaction on this head. In short there are two principles, which I cannot render consistent ; nor is it in my power to renounce either of them, viz.: *that all our distinct perceptions are distinct existences, and that the mind never perceives any real connexion between distinct existences.* Did our perceptions either inhere in something simple and individual [=indivisible], or did the mind perceive some real connexion among them, there would be no difficulty in the case. For my part, I must plead the privilege of a sceptic, and confess, that this difficulty is too hard for my understanding. . . .”

Let us see how the theory advocated in these essays attempts to resolve it. Is it necessary that the perceptions—that is, the acts of simultaneous intuiting, intending, and affirming by which an apparent thing is made present to the self—should inhere in something “simple and individual” or indivisible, in order that the difficulty may disappear? Surely it is sufficient that they should inhere in something, the parts of which have *real connexions*. The parts of the self—the sensations, in our sense of the word, composing it—being in space and time, and consisting of ultimate elements that have spatial and temporal junctions between them, have real connexions. It is owing to these real connexions that a visual sensation, for example, can prompt to a motor reaction and so come to convey the meaning, “an external thing”. It is owing to the spatial con-

nexions between its parts that a complex visual sensation can, when we have acquired tendencies to respond differently to its parts and have been able to synthesise these tendencies into a single complex tendency, convey the meaning, "a complex external thing". And in the same way, when the tendencies combined do not accompany but follow each other—as where we see the parts of some simple motion of matter, say, the lifting of an arm, as one whole—it is owing to the temporal connexions between the successive sensations and to the fact that these evoke a single response of the attention, or—if the arm is first raised and then lowered—a sequence of connected responses, that we are able to perceive either the lifting, or the lifting followed by the lowering, as one whole.

What Hume must abandon, then, is his principle that the mind never perceives any connexion between distinct existences, retaining his view that distinct (not perceptions but) sensations are distinct existences.

2. *Kant's "I think"*.—It is gratifying to find that Kant retains belief in an "inner sense", distinct from the external senses through which we receive impressions from outer things; until we discover that, by "inner sense", he means a form of awareness or experience, the sole deliverance of which is "I think", or, since he considers that time is "the form of the inner sense", a succession of "I thinks": in other words, something including that immediate experience of "consciousness" which James denied.

From Kant dates the notion that what we mean by "I" is the act of awareness, or the unity of this

act—so that, when we say “ I am conscious ”, what we really mean is that consciousness is conscious, or that the unity of consciousness is conscious ; and when we say “ I think ”, what we really mean is that thinking thinks, or that the unity of thinking thinks. A verbal quibble, the reader may exclaim : what is meant is only that consciousness or thinking *is*, and that the “ I ” is no other than the actual occurrence of this consciousness or thought—as appears from the fact that, when it ceases, we cease. The trouble with this interpretation is that the word “ consciousness ” is ambiguous, and may mean either awareness or the sensations composing the self. Taken in the latter sense, it is quite true that the existence of “ consciousness ” is our existence, and that if it ceased we should cease. But the use of “ thinking ” as an alternative shows that the word is really meant in the former sense, the sense of awareness ; and awareness is a function or act, which presupposes an agent, in the shape of “ consciousness ” in the latter sense.

It is not true, as Kant assumes, that introspection reveals “ thinking ” in the sense of awareness, or an “ I think ” which is at once awareness and the being who is aware. It reveals only the “ I ”—and at a moment when the “ I ” has ceased to be aware and become itself an object. It must reveal this “ I ”, as an object of experience, *before* we can by any possibility learn about the awareness.¹ This “ I ”

¹ Thus, instead of its being true, as Descartes held, that we may infer *sum* from *cogito*, it is just the other way about, and we have to infer *cogito* from *sum*.

is the self, which consists of sensations and appears as the organism. The "I" is therefore, like the organism, a whole composed of parts. It is true that the self would not continue to exist as a self if its parts did not cohere and co-operate—any more than the body of an animal would continue to exist as a body if its parts did not cohere and co-operate: but it does not follow from this that the agent who performs the act of awareness is anything other than the co-operating parts, or the whole which they momentarily form.

Philosophers do not yet realise how great a revolution in philosophy must necessarily follow from James's discovery that awareness is not a possible datum of experience. It removes the basis, *awareness of awareness*, on which the reasonings of all earlier modern systems were founded.

3. *Mill's "Series of Feelings"*.—J. S. Mill, in endeavouring to construct a mind out of sensations, found himself faced with the paradox of "a series of feelings aware of itself as a series". Nor could he explain how such self-awareness is possible.

But when is an entire series of feelings ever aware? What is aware is only some momentary feeling, lasting at most a short length of time. If, then, there is to be awareness of a series as such, and this entire series is to be the object of the awareness, the feeling which is the subject of it must necessarily be a later feeling, additional to the entire series—perhaps the next feeling in the self in question. This feeling must in some form remember the series; perhaps, if the series

was a short one, in the way in which we have suggested that awareness of a series of musical tones may arise ; or, if the series was a long one, it can be remembered only symbolically, by using some single feeling—such as the word “ series ”—as the sign of that too numerous sequence. It must be evident that awareness of a series of feelings as such can quite well arise in this way.¹

4. *Clifford on the Unity of Apperception.*—Clifford deserves more than a word. In his essay “ On the Nature of Things-in-Themselves ”—the original mind-stuff essay, gospel of later adherents of the doctrine—occurs the passage : “ This being so, it will be said that there is a unity in all this complexity, that in all these varied feelings it is I who am conscious, and that this sense of personality, the self-perception of the Ego, is one and indivisible. It seems to me (here agreeing with Hume) that the ‘ unity of apperception ’ does not exist in the instantaneous consciousness which it unites, but only in subsequent reflection upon it ; and that it consists in the power of establishing a certain connexion between the memories of any two feelings which we had at the same instant. A feeling, at the instant when it *exists*, exists *an und für sich*, and not as *my* feeling ; but when on reflection I remember it as my feeling, there comes up not merely a faint repetition of the feeling, but inextricably connected with it a whole set of connexions with the general stream of my consciousness. . . . ”²

¹ Cf. *The Origin of Consciousness*, pp. 251-252.

² *Lectures and Essays*, p. 281.

This, I think, comes very close to a true account of the matter. It fails, mainly by not distinguishing between the feelings existing at any moment and the apparent thing of which they make us aware : from which distinction the consequence follows, that we may be simply and indivisibly aware of an object at the moment when the feelings exist, and do not have to wait until a subsequent moment for apperception (consideration of them together) to unify them : the only unity being that of the function which the feelings perform, in enabling us to picture and intend a single thing.

Feelings, then, do not themselves have to be one, in order to produce the unity of awareness ; and it remains an exalted merit of Kant, that though he did not assert a soul, he at least denounced the fallacy of arguing from the unity of awareness to a simple and indivisible one.

II

The Manyness of Sentience

If the soul is not simple and indivisible, it must be composite and divisible. Let us, then, seek to make our conception of it entirely clear by asking as to the number of the elements of which it is composed, and by considering more carefully than we have yet done the nature to be ascribed to these elements.

As respects their number, the view to which we are committed has already been expressed in the essay

on the continuity of space and time. The ultimate elements of sentience are the units existing in points at instants, and their number may be infinite. As the whole of Nature has extension without position, so its smallest parts have position without extension. They are bound together by junctions, due to the action of the units.

As respects their nature, the view here maintained is that they have the same nature as those aggregates of them which are souls, and with whose nature we become acquainted in introspection ; or, if you please, they have that nature without which souls, capable of feeling and being aware, could not arise naturally. Is it possible to attach a clear meaning to this conception of sentience ?

I will suppose that, notwithstanding all I have thus far said, the reader is still unconvinced of the legitimacy of this conception. *If*, he may say, there were such a thing as sentience, and its nature were clear, the theory here set forth might explain the origin of the mind : but what exactly does the word “sentience” mean ? We know what is meant by a “feeling”, if the thing referred to is pain, or a sensation of warmth or of sound ; but what is a feeling that nobody feels, and that does not possess any specifiable quality ? Is it not a timely word that presents itself where ideas are lacking ?

My answer of course is, No.

(1) By “sentience” I mean the sort of being that pain, warmth, and sound have in common. The warmth and sound here referred to are not warmth

and sound as external qualities, but the corresponding sensations. When we hear a bell, its sound is an external quality, and it is not from this that the conception of sentience can be obtained; in simply listening to a bell we are not aware of anything that can be called sentience. But we can turn our attention from the external event to the feeling in us, and what we then become aware of is the sensation of sound. Similarly we can turn our attention from warmth as a quality of warm water to the warmth as a feeling in us. In both of these cases we are introspecting, and the warmth or the sound then appears as having the same sort of being that pain has. Thus the idea of sentience is derived solely from objects of introspection.

The next point to notice is that introspection is a form of awareness revealing something real, and that, if our theory of awareness is correct, there must be here, just as much as in perception, a distinction between the thing introspected as it appears and as it really is. Simplification takes place in generating the data of introspection, no less than in generating sense-data, and to it is due that simplicity of quality which makes pain, warmth, and sound absolutely distinct from and irreducible to one another. But, because as data of introspection they are irreducible and simple, it does not follow that the objects, the states of sentience, brought before us in the form of these data are so. On the contrary, they are exceedingly complex, and may be composed of the same kind of elements. Their difference as data is due

to the fact that a different spatio-temporal arrangement of the elements underlies sound from that underlying warmth and pain ; while the fact that sound, warmth, and pain are alike modes of feeling points to an identity of nature in the elements—to their having the same sort of being.

A natural illusion tempts us to suppose that this sort of being is simply their being before us—that what pain, warmth, and sound have in common is only the relation to us by which we are aware of them, but that the objects of our awareness are absolutely different. This illusion rests on the assumption, which we have shown to be erroneous, that awareness is a datum of experience. As long as awareness was supposed to be introspectively observable, this interpretation could be put upon the facts. If it is not observable, then that common sort of being which we do observe must be in the states themselves.

When we do not introspect but perceive, this sort of being is that which causes the external qualities of warmth or sound or colour to be there before us. No one can avoid recognising this sort of being. If you are an objectivist, you say it is the *existence* of the thing perceived.¹ If you are a materialist, you must at least admit that the matter of the brain has the power of temporarily communicating its own existence to external things so as to cause them to

¹ It will be seen that I agree with objectivists in regarding this sort of being as the nature of the real, and dissent from them only in maintaining that the being of the sense-datum is apparent, not real, and a projection of the being of the self—as the light of the moon is a reflection of the light of the sun.

appear—otherwise you are a dualist. Only if you commit the fallacy of supposing awareness to be observable can you escape from this reasoning, and deny the reality and observableness of sentience.

(2) I trust I have now made perfectly clear what I mean by “sentience”. It may be defined as *that by which things are apparent*—not in perception and introspection merely, but equally in memory, expectation, and thought. It is only in introspection, however, that this sort of being is discerned as that by which feelings exist and are entitled to the name.

No one will deny that data of introspection, like all other data, have this sort of being; but it may be asked by what right I ascribe this sort of being to the introspected objects, the states as they really exist. I must prove, if I can, that *these* things, at least, really have this sort of being, and are, in themselves, of the nature of sentience. We can then consider whether other real things are, in themselves, of the same nature.

A number of considerations must here be taken into account. In the first place, it has been shown in preceding essays that, unless we place instinctive trust in the deliverances of perception and introspection, we can have no knowledge at all. Our proper attitude, therefore, is to accept the data of these functions as true predicates except where they contradict one another.

But in introspection the situation is peculiarly favourable to adequate knowledge, in that a state of the self is cognised by means of a reproduction

or a later phase of itself. The datum formed by projecting (or, more exactly, introjecting) the image or later phase is therefore especially competent to exhibit the introspected state truly. Simplification, no doubt, intervenes, but has only the effect of suppressing parts and creating sensible qualities, without being able to alter that fundamental being, sentience, which the introspecting state and the introspected state have in common. This fact is the ultimate basis of our ontology, and the nerve of the disproof here given of agnosticism. Things in themselves *are* knowable as to their nature.

The only remaining question is whether we are justified in ascribing this sort of being to the parts, severally, of which the real state is composed. The answer to this doubt is given by the fact that, when awareness is discriminative—as in vision of many objects at once—the sort of being in question belongs to *each* part, and that any wholeness of the datum that cannot be accounted for in this way is due to that remainder of simplification which we admitted. There could be no simplification unless parts, really existent in the introspecting state, disappeared in the datum.

This recognised, no limit remains to the smallness of the parts which may be regarded as having this sort of being : and the only real parts, as our analysis of space and time shows, are the units of energy or sentience in points at instants.

To complete our conception of these infinitesimal

feelings, we must ask whether they have *quality*, and, if so, what quality or qualities. Every feeling known to us has a quality as well as a sentient being, and it is natural to suppose that the same must be true of these ultimate units.

One pitfall must be pointed out at the start. If we conceive the units of feeling as having a quality, we must not imagine that their sentient being is an *awareness* of the quality. Ordinarily we think of pain as a quality given to awareness, but, as we have seen, the sentient being of the pain is also so given ; and in the ultimate units there is obviously no awareness, for this is a function possible only to animals. The quality, if there is one, and the sentient being will thus be on the same footing—much as are the light and the colour in a coloured light.

It may help us to decide this question if we examine somewhat more fully the conditions under which the familiar sensible qualities arise—such qualities as red, sweet, warm. According to our hypothesis, these qualities are produced by the simplification of spatio-temporal arrangements of elements. The elements which we had in mind were not the ultimate units of feeling, but aggregates of them corresponding to elementary nervous processes—say, to individual nerve-impulses.

Sensible qualities are so many and so markedly different from one another, that the suggestion that they may all be based on various arrangements in space and time of a single kind of element seems at first sight incredible. But this doubt is perhaps only

due to our ignorance of the variety of the resources in Nature. With all the variations of electricity, light, sound, temperature, and who knows what besides that are available in the physical world, the possibilities of combination surely are infinitely numerous ; and which of these combinations have been utilised in the construction of the nervous processes on which sensation depends, we have yet to learn.

It may be replied that this way of accounting for the marked differences between qualities would be applicable, if the elements combined were processes outside the organism, where heat, light, and electricity are in full swing ; but that it has been shown by the investigations of physiologists that the elementary processes in the nervous system are all of one very simple kind, namely, nerve-impulses, and that the difficulty is to understand how combinations of these in space and time can generate qualities having such marked differences from one another.¹

This perplexing question undoubtedly presents itself if we accept the customary view of physiologists concerning the basis of sensation, a view long since

¹ In the preface to his book on *The Basis of Sensation*, Adrian says : "Sensation is aroused by the messages which are transmitted through the nerves from the sense-organs to the brain, and this is a description of the nature of the sensory message and the way in which it can be recorded and analysed. It turns out that the messages from our sense-organs are all made up of a common vocabulary of the simplest kind. They consist of a series of brief impulses in each nerve-fibre ; all the impulses are very much alike, whether the message is destined to arouse the sensation of light, of touch, or of pain ; if they are crowded closely together the sensation is intense, if they are separated by long intervals the sensation is correspondingly feeble."

formulated in the doctrine of the "specific energy of the nerves", and which may be the truth on the subject; but if it is true, the power of mere combinations of these simple elements to generate different qualities must be far greater than one would imagine. One cannot help trying to conceive alternatives; the difference between light and sound, as qualities, would be so much easier to understand if the basis of the latter were mechanical and the basis of the former electric—if, that is to say, their nervous bases were as different physically as light and sound are in the physical world.

But an entirely different possibility has occurred to me, suggested by the sharp distinction which our theory of cognition makes between feeling and awareness—between sensation, as the intrinsic being of a process occurring at a certain point in the body, and what the sensation shows, a function conferred on it by the motor process it calls forth. This possibility is that, notwithstanding the traditional physiological theory to the contrary, the basis of mere sensation is wholly or partly a process in the sense-organ. The sense-organ is in immediate contact with the outer world, and directly played upon by light in the case of vision, by air-waves in that of sound, by external heat, cold, and hardness in the case of touch; and though the sensation is not an apprehension of these external influences but only the intrinsic being of the process in the sense-organ, yet this process, owing to the structure and mode of operation of the sense-organs, is vastly more different in the retina, the

cochlea, and the skin respectively, than the resulting central processes are from one another. The retina, if I am not mistaken, is genetically a part of the brain : why may not this part of the brain be, with or without the other connected parts, the seat of visual sensations ? Why should it be disqualified from being their seat by the fact that it is somewhat further away from the remaining parts than they are from one another ? Why must even the processes in the cochlea, the nose, the tongue, and the skin be without a psychical correlate ?

If there is anything in this suggestion, and the peripheral processes should chance to be the sole basis of sensations, the " messages " sent inward to the centres would, from the very outset, be motor messages (in a broad sense)—that is, messages tending to secure the right response ; for which the prime condition is, different messages for different combinations of stimuli, but not necessarily messages calling forth in the centres a duplicate of the peripheral process (any more than, on the ordinary view, the motor processes in the cortex duplicate the sensory processes). After removal of a sense-organ, no sensations of the particular sort would any longer be possible, not because the requisite central process cannot now occur, but because the organ is missing which is the seat of that kind of sensation. After destruction, on the other hand, of the central area without damage to the sense-organ (or after interruption of the nervous connexions between the sense-organ and the muscles, *e.g.* by lesion) the sensation might still occur, but it

could no longer give rise to awareness, and would, therefore, for us who can learn the existence of sensations only by being aware of them, be as if it were not.

In favour of this suggestion it is perhaps not irrelevant to cite Head's view that the special function of the cerebral cortex is discrimination—the effecting of differential reactions to parts and aspects—and that bare sensation and emotion may have their seat in the basal ganglia. The view above suggested only assigns to them a still lower seat at the banquet of life—the seat where they appear to ordinary introspection to be. Surely it would be a not uninteresting return from a time-honoured paradox if it should prove that, after all, we see with our eyes, hear with our ears, smell with our noses, and touch with our finger-tips, instead of performing all these functions with our brains. According to the traditional view, we feel a toothache, an earache, a stomach-ache, sciatica, and angina pectoris, all with our heads—not merely a headache. These pains are referred to the bodily parts where their causes lie by “projection”. It is not for me to criticise the notion of projection; but it would simplify matters if we could believe that the seat of every sensation (apart from mistaken localisation, as in the case of “referred” pains) is the bodily part where it is felt as being, and that projection occurs only in the reference of visual, auditory, and tactile sensations to their causes outside the body.

Our suggestion does not go so far as Bergson's

view, for according to him the sensation is "in the object", and the entire process running from the sense-organs through the brain to the muscles is purely motor—an evoking of the right reaction. Consciousness vanishes when this process is interrupted, for a reason analogous to that which makes a hung-up garment fall when the peg is removed. Our view, on the contrary, would be that the boundary between the sensory and the motor is the boundary between the process in the sense-organ and the nerve-currents proceeding from it; nor shall we deny that the long process in the ascending and descending fibres and its transmission through the synapses in the brain has some sort of sensational accompaniment. Above all, we shall insist that a sharp distinction must be made between the entire complex of feeling corresponding to this total nervous process, and the awareness either of external things or of the self which accrues to it in the form of an external function.

If there is anything in this suggestion (and I put it forth, inexpert in neurology as I am, with fear and trembling), it restores to us the power of using the actual variety of the forces of Nature for the explanation of the differences between qualities—at least as immediate stimuli. The basis of visual qualities may perhaps not be in any degree electric, but be only the chemical effects produced by the action of different wave-lengths of light on the retina; the basis of auditory qualities, and also that of tactile qualities, would be purely mechanical. Physiological

investigation, of course, must decide what in each case the basis of the sensible quality is. If, despite my limited acquaintance with current work on the subject, I venture to throw out this suggestion, it is because the distinction here maintained between sensation and awareness seems to me to have a bearing on the question.

Leaving the problem of the seat of sensations and basis of their qualities to be solved by physiologists, let us now return to the question whether the ultimate units of sentience have a quality, and compare the two situations. These situations are essentially different. Whatever be the basis of the sensible qualities—of red, sweet, warm—they are in any case produced by a simplification of elements which do not possess the quality in question. In any case, *these* qualities have no existence in the real world. They exist only as data of awareness, and in the ultimate units there is no awareness. To ask whether these units have a quality seems, therefore, a little like asking what is the colour of an atom or an electron.

These units of feeling are the intrinsic being of the units of energy in points. We have supposed that a point can contain a greater or a smaller number of units of energy, in order to explain the variety of Nature; since the only alternative, for explaining this variety, is the Epicurean view that Nature consists of atoms and the void. The units of energy, and therefore of sentience, are supposed to be all alike. The differences between what is in one point

and what is in another will accordingly be only differences of intensity ; and qualities, if they are to be like the sensible ones, must depend on arrangement.

I will not conclude from these considerations that the ultimate unit of feeling has no quality. Since every feeling known to us has a quality as well as a sentient being, I prefer to say that such quality as the ultimate units have is the quality necessary, in order that by simplification of spatio-temporal arrangements of them the familiar sensible qualities should arise. This quality will be absolutely non-picturable : like the sentient being of the ultimate unit, it can be reached only in the form of an abstract conception, by reasoning correctly from the data of sense. And I should be quite willing to make a statement analogous to the foregoing in regard to the sentient being of the ultimate unit : this being, which I call "sentience", is whatever being the ultimate units must have, in order that, when organised in the form of sense-organs and a brain, they may cause objects to appear.

I hope I have now succeeded in removing the difficulties attaching to the conception of sentience, and in making perfectly clear what that conception is. The view proposed seems to me to explain the applicability of mathematics to the real. All the differences of things are due to number ; what is not number is all alike. Our philosophy is thus a Pythagoreanism, justifying what is sound in the ideas of Plato.

III

Origin of the One from the Many

After all the analyses and explanations that have been given, the way in which our evolutionary psychology attempts to account for the natural origin of the mind will, in general, be clear to the reader. It consists in regarding all awareness as functional, and sentience as the permanent nature of things. Yet, to make this abstract scheme concrete and vivid, and show that the explanation really explains, I will now apply it to the experience of waking from sound sleep, or, better still, to the recovery of consciousness after being under chloroform.

Human consciousness is more complex and hierarchical than we are wont to imagine it, and we shall not be really applying the scheme unless we duly recognise and allow for this complexity and superposition of awarenesses. When a psychologist wakes or recovers consciousness, and is acutely aware that he is conscious, he is not merely aware, as the lower animals are, but is also aware that he is aware—and perhaps even aware of this latter awareness : so that awareness is, so to say, raised to the second or even to the third power. *Each* of these awarenesses must be interpreted in terms of our theory of awareness. Do this, with a full sense of the different forms of which human awareness is capable, and you will recognise that the theory is a possible account of the facts.

(1) A cat or a dog is aware, but is not aware that he is aware. The field shown by his awareness (it may include internal sensations) is simply there before him. When he is asleep this field does not appear, because the processes necessary to awareness—stimulation and reaction—do not occur in his sense-organs and brain. When he wakes these processes occur ; and, if our analysis of awareness is correct, they must inevitably make him see and hear, without making him aware that he does so.

(2) When a man wakes or recovers consciousness, the same change takes place, with the addition that, on some exceptional occasions, and especially if he be a psychologist, he is aware that he is aware. What is this added awareness, this sense of being conscious ? We come here to the particular situation which is the source of our notion of consciousness as something so unusual and different from anything else in the world ; and it calls for accurate analysis.

The sense of being conscious is not the mere existence of awareness, but awareness that we are aware—reflection that there is a relation between the field and our feelings (both by turns cognised) such that we are aware of the field.

Let us suppose that I am looking at an ivy-covered wall, and that, besides seeing it, I am more or less acutely aware that I see it. My attention passes back and forth between the wall, an object of perception, and my sentient self, of which I am aware by introspection ; I feel their spatial relation, and also my own kinaesthetic activity in looking ; and I reflect

that this activity is evidence of a peculiar relation or function connecting my self with the wall—of an unobservable act of awareness. Perception and introspection we have thoroughly discussed ; reflection, which is a form of thought—that is, of awareness of relations—we have also discussed. Our theory of awareness provides everything that is necessary for the understanding of this special case.

But there is more in the case than has yet been mentioned ; for, to introspect, I have to use immediate memory, and, to reflect, I have to use memory not so immediate. These functions add a new dimension to the field of my awareness—it recedes into the past ; and also, no doubt, extends forward into the future. But memory and expectation have also been thoroughly discussed. They hardly exist in the lower animals ;¹ and in these the field of awareness has not that added temporal dimension. Still further, human beings are capable (this gives to awareness what we called its “ fullness ”) of intending on the largest scale things which they do not explicitly imagine—as when we read intelligently ; and this expands indefinitely the field of human awareness. But all these extensions of awareness are completely intelligible on our theory, if only it be exhaustively applied.

(3) I have been speaking thus far of the positive side of awareness ; but it has also a negative side, of which due account must be taken. If we are *not* aware of anything, we are blind to its existence and,

¹ Cats do not “ lie awake at night and whine over their sins ”, as Whitman irreverently says.

however inwardly sentient or functionally aware it may be, it is for us as if it were not. The world might be full of light, but if there were no eye to see it, it would be as if it were dark. Now human knowing is thus limited. Experiences which we forget are for us as if they had not been. The lower animals are oblivious of their past, and we are oblivious of much of ours. Yet memory, according to most philosophers, is the bond which holds personality together. There are epileptic conditions—*Dämmerzustände*, the Germans call them—in which a person acts consciously, but straightway forgets all that he has done, being afflicted with a total amnesia for his past. Such a person is not only unaware of his past experiences, but presumably unaware at each moment that he is aware. But it is this latter experience, as we have seen, that is the source of our notion of consciousness as something unique and inexplicable.

The vital point, for our purposes, is that this “consciousness”, which seems so inexplicable, is *not consciousness existing, but consciousness known*—awareness of the fact of awareness. If consciousness merely occurred, without being known, we should not know of it and think it such an extraordinary thing! The experience in question is awareness raised to the second power, and our theory accounts for it.

Such, then, is the explanation here offered of the return of consciousness after sleep or chloroform, and, in general, of the natural origin of the mind. This explanation may not be correct in its details, but in

its essence it is founded on a rock. The rock on which evolutionary psychology rests is the fact that consciousness arises by natural processes, and that a world in every sense dark, a purely material world, cannot naturally produce the light of consciousness.

VIII

A DEFENCE OF MIND-STUFF

A piece of arrant nonsense.

SHADWORTH HODGSON.

Psychological barbarism.

JAMES WARD.

The silliness of the mind-stuffists.

WILLIAM JAMES.

SUCH were the judgements passed by leading authorities of the last century on the theory which I make it my business in this essay to defend. This is not the first time, in the history either of philosophy or of science, that a theory has been rejected by the builders as crude and erroneous, and has afterwards had to be restored to its rightful position as a cornerstone of thought: witness the revival in our day of the corpuscular theory of light (in combination with the wave-theory, it is true), and the even more unexpected resuscitation of common-sense realism (stripped of some of its naïveness). Still other resipiscences and reviviscences may confidently be looked for. The “soul”—for there is a soul, though it is a complex of feelings; “faculties”—for there are faculties, though they have to be explained in the proper motor manner; “associationism”—for

association, in some form, is truly the bond that holds our ideas together ; “ consciousness ”—that is, the function of awareness with its self-transcendent intent—are among the entities which the blindly empirical and fallaciously idealistic XIXth century threw overboard, and which the XXth century is bound to re-establish. And “ mind-stuff ”, as I shall now try to show, must be added to the list.

James’s chapter on “ The Mind-Stuff Theory ”, in his *Principles of Psychology*, is the most searching criticism of this theory known to me ; and I have long felt that, if I could reply successfully to the arguments of that chapter, the rehabilitation of this unjustly condemned doctrine, this victim, as I am convinced it is, of judicial error, would be secure.

I

The Subject-Matter of Psychology

James begins his chapter by speaking of metaphysics as “ an unusually obstinate effort to think clearly ”. James himself made the effort, and deeply are we indebted to him for some of its results ; but it cannot be said that, in the crucial case of the subject-matter of his own science, his effort was entirely successful. On the first page of this chapter he refers to the theory he proposes to combat as “ the assumption that our mental states are composite in structure, made up of smaller states conjoined ”. It is important, therefore, that we should ask what is the conception of “ mental states ” which James has

in his mind in raising this issue. For, according as he means by the term (1) acts of awareness with their data, or (2) states of the self—what I call “sensations”—we may be disposed either to assent to or to reject his view that they are not composite.

The question is complicated by the fact that James, in the course of his development, took up two quite distinct positions with regard to mental states. In his larger work, he distinguishes the “thought” from the thought’s “object” (vol. i, p. 186)—that is, the awareness from what we are aware of—and remarks (p. 185) that everyone agrees that when we look within our minds we discover states of consciousness. But by the time when he prepared his *Briefer Course in Psychology*, the doubt that had long troubled him as to the existence of “consciousness” had grown into a disbelief, such that he no longer had a “thought” to oppose to the “object”. The passage is so significant, and so little known, that I reproduce it here entire.

“But ‘worse remains behind’. Neither common sense, nor psychology so far as it has yet been written, has ever doubted that the states of consciousness which that science studies are immediate data of experience. ‘Things’ have been doubted, but thoughts and feelings have never been doubted. The outer world, but never the inner world, has been denied. Everyone assumes that we have direct introspective acquaintance with our thinking activity as such, with our consciousness as something inward and contrasted with the outer objects which it knows.

Yet I must confess that for my part I cannot feel sure of this conclusion. Whenever I try to become sensible of my thinking activity as such, what I catch is some bodily fact, an impression coming from my brow, or head, or throat, or nose. It seems as if consciousness as an inner activity were rather a *postulate* than a sensibly given fact, the postulate, namely, of a *knower* as correlative to all this known ; and as if ‘ *sciousness* ’ might be a better word by which to describe it. But ‘ *sciousness* postulated as an hypothesis ’ is practically a very different thing from ‘ states of consciousness apprehended with infallible certainty by an inner sense ’. For one thing, it throws the question of *who the knower really is* wide open again. . . .” And he heads this striking passage with the declaration, in bold type : “ *States of consciousness themselves not verifiable facts* ”.¹

In the present series of essays, we have answered the question “ *who the knower really is* ” by saying that it is the self, composed of sensations ; which latter are apprehended in introspection, not “ with infallible certainty ”, but yet under conditions which make it probable that they appear to some extent as they really are. The confusion of thought in James’s passage is due partly to the fact that he does not know whether what he wants, as a “ *knower* ”, is awareness or sensations. Disbelief in a soul disposes him to think that it is only awareness that is wanted. And yet how sane and healthy-minded is this search for awareness as an observable datum,

¹ *Briefer Course in Psychology*, p. 467.

and how perceptive the failure to discover it, except in the form of bodily sensations! Had James not been blinded by the traditional phenomenalism, with its reduction of all objects to "appearances" and its denial of introspection as a form of acquaintance co-ordinate with perception, he might have recognised that awareness of the physical demands psychical sensations as its vehicle. As it is, he succumbs to phenomenalism, and his psychology henceforth will be a psychology that operates with appearances and nothing but appearances; leading straight to that "radical empiricism", or reduction of all existents to a single plane, the plane of *experienced objects and relations*, which is the theory of his later years.

No escape from this confusion and over-simplicity is possible except by a return to James's earlier view—the view that in all cognition there are *two* planes, the plane of the object and that of the subject, the former knowable by perception (if perception is the sort of cognition in question) and the latter by introspection; from which it follows that awareness—the relation or function by which the subject apprehends the object—is known only by a still later act, an act not of apprehending a sensible datum but of divining, by reflection, the relation that must have existed at the moment of cognition between the subject, composed of sensations, and the object which the subject intended and knew.¹

¹ The reader has now heard my last word in criticism of phenomenalism. I wish we had heard the last of the fallacy. I have been tempted to place at the end of each of these essays the words, *Ceterum censeo delendum esse phaenomenalismum*.

These remarks as to James's earlier and later views make it clear that really there are *three* different things to which his denial of the compositeness of "mental states" may apply: (1) the object as given to awareness—the apparent thing; (2) the subject who is aware; (3) the relation or function of awareness. Let us, then, take these up one after the other, and inquire how far in each case the denial is justified. It will be best to begin with awareness.

It is evident, and has been expressly maintained in the preceding essay, that an act of awareness is not divisible—divisible into smaller acts, or into any other parts. An act, being, by definition, a response of the entire organism, is not divisible into parts which are also acts. No relation, *e.g.* similarity, is a divisible thing. The reaction or tendency to reaction, on which awareness depends, cannot indeed be denied to be divisible: for every movement of the muscles and every process in the nervous system is a complex of innumerable parts, however organically connected and necessary to the movement or process as a whole these parts may be. But the act of awareness itself is not thus composite, because it is that intending of and report concerning an object which the nervous process and resulting movement necessarily carry with them, and which they cannot carry with them unless all the ingredients of the total situation are present. At a single moment the self can refer to and report only one simple or complex whole. So far, therefore, as James's denial relates

to acts of awareness, he is entirely right in maintaining that they are not composite.

The next question is how far the non-compositeness of the act of awareness involves, also, a non-compositeness of the deliverance of the act, the apparent thing. By the "apparent thing" I mean here not necessarily a single object, but the total momentary deliverance of the awareness, whatever it is. Now this may be either non-discriminate or discriminate—at one extreme it may be simple and without parts, at the other it may consist of many parts joined together by relations which give to the parts a definite order. An example of the former sort is the babe's first view of the external world—that "blooming, buzzing confusion" so aptly characterised in James's familiar words. An example of the latter sort is the field of vision when we enter a room or look at a landscape. When, as in the case of the babe, no parts are discriminated, we may admit at once that the apparent thing is as non-composite as the act of awareness. But in the case of ordinary vision, must we not say that the apparent thing is very composite—not, indeed, by any manner of means as composite as the real thing, but yet composed of as many parts as are actually discriminated?

The parts, of course, are undeniable. But if we were to mention only them, we should be overlooking the fact that they have an order which is also in some sense present—that, in a word, they form a whole, which is just as truly present to awareness as the parts are. This whole, it is true, has only *ideal* unity

—unity due to the fact that it is present to awareness—and does not imply any similar unity of the whole as it exists in Nature. We can understand this ideal unity when we remember that the whole is present to awareness because, though there are tendencies to react to parts, these tendencies form elements in a single total reaction which is what makes us aware of the whole. Moreover, no whole given to awareness is ever completely and exhaustively discriminate: along with the parts that stand out distinctly there is always an unresolved background of the simple—much as, in a mist, some near object may stand out clearly, and farther ones remain blurred and vague. The visual field always fades away into vagueness and indiscriminateness at its margin. Discriminated objects, in short, as was pointed out in the last essay, are always emergent from the original simplicity of the sensible. We may therefore grant that the apparent thing, like the act by which it appears, is in all cases non-composite, and that James is right in maintaining that it is not composed merely of smaller apparent things conjoined.

The third and last entity with respect to which the question of compositeness arises is the knower or subject. James, in his later theory, has no such third entity (both the subject and the knowing having been absorbed into the object), but that must not prevent us from asking the question. The answer we have given over and over again is that the subject or self is extremely composite. It is composite temporally, since it passes through a series of different

states. It is also composite, and extremely composite, spatially, as is evident from the fact that, when looked at from without, it appears in the form of the nervous process or the total bodily process. A chief merit of this view of the self is that it so naturally explains discrimination: how understand the breaking up of apparent things, under close attention, into parts, unless the self which at first apprehended the thing as simple was composed of parts, and perceived the thing as simple so long as its parts evoked only a simple reaction, but became aware of parts when its own parts began to evoke or tend to evoke many reactions?

But this view of the self is the mind-stuff theory which James combats! He has precluded himself from accepting it by his failure to recognise that, in acquaintance with present things and not merely in thought of absent things, there is a function of awareness which is quite distinct from that *of* which we are aware. He came, like Hercules, to a fork in the road where the choice lay between looking for "a knower correlative to all this known", or concluding that there is no knower distinct from the known itself, and he took the wrong turn; misled by the notion that what he was looking for, as the knower, was "consciousness" or "activity"—something only "postulated"—and not the concrete feelings whose existence we learn through introspection. His position came to be the strange one of a psychologist denying existence to the subject-matter of his own science. That is what happens when,

through listening too credulously to the doubts of Hume, one loses sight of the real in the mist of the apparent.

II

The Arguments against Mind-Stuff

With the distinction between the three possible meanings of "mental states" in mind, we are now prepared to weigh and pass judgement on the reasonings by which James seeks to refute the mind-stuff theory. Every one of the difficulties he raises can, I believe, be completely resolved.

"Evolutionary psychology", he says at starting, "demands a mind-dust." And cannot have it? A lame and impotent conclusion. It must be clear by now that there is no ground whatever for despairing of the possibility of such a psychology.

A word, first, regarding the term "mind-stuff". It is not a happy one, for the double reason that this is not a stuff, except in the most abstract sense of that word—the sense in which human beings might be said to be the stuff of which society consists; and that what this stuff forms, when it is put together in the proper way, is not the mind, but the soul. The term "soul-dust" would come nearer to expressing the exact idea; for the elementary particles of which this dust consists are the occupants of spatial points. But to consider only the dust-like particles would be to ignore the junctions which connect the occupants of points at instants into the spatial and temporal

continua, and which, as we saw in a preceding essay, depend on the powers by which these ultimate existents interact and produce the future. A truer expression would be "soul-fluid", if "fluid" were not so obstinately material a term. "Flux" is a well-established philosophical word: why should we not call it "the psychical flux"?

Now for James's arguments. The first is the utter difference of nature between the psychical and the material; and he quotes striking passages from Spencer and Tyndall to this effect. "We do not possess the intellectual organ", says the latter, "nor apparently any rudiment of the organ, which would enable us to pass, by a process of reasoning, from one to the other." Why has it occurred to none of these writers that, if matter owes its materiality—its appearance of being different in nature from sentience—to the fact that we perceive it from without, we do possess the organ in question? Modern idealism, holding as it does that objects exist only by being perceived, or, in its Kantian form, that their true nature is unknowable, surely suggests at once, when we reassert their reality and doubt their unknowableness, that their true nature is psychical: a possibility which Kant himself admitted, but of which Spencer, Tyndall, and James seem never to have heard.

James is of course perfectly right (and Tyndall is, too) that there can be no intellectual passage from a nature supposed to be purely material to the psychical nature. "A motion became a feeling!"—

no phrase that our lips can frame is so devoid of apprehensible meaning." He is very effective in pointing out the absurdity of Spencer's attempt to derive consciousness from matter by making the former "nascent", and the insufficiency of Tyndall's assertion that he "discerns in matter . . . the promise and potency of every form of life", mental life included. James winds up with the proposition, "If evolution is to work smoothly, consciousness in some shape must have been present at the very origin of things".

This sentence contains the ambiguity, on the exposure of which I rely for the clearing up of this entire question. "Consciousness in some shape." If emphasis be laid on the first word, and it be taken in its usual sense, the statement is as objectionable as anything said by Spencer or Tyndall. It is like saying that, if evolution is to work smoothly, animals in some shape must have been present at the origin of things. If the words "in some shape" have the stress, the statement is a truism. James's use of the term "consciousness" here indicates that he has not yet grasped the difference on which the whole question turns—the difference between feeling, which is the nature of the soul or self, and awareness, a characteristic of the cognitive function. What must be present at the very origin of things is feeling, in its most elementary form; to suppose that awareness was present then is to suppose that nothing exists in the whole universe but animals.

In the next two sections of his chapter (pp. 150-158).

entitled "Some Alleged Proofs that Mind-dust Exists" and "Refutation of these Proofs", James comes to close quarters with the theory, and examines the proof of it given by Spencer and Taine—the transformation of a series of separate sounds, with increase of rapidity, into a musical tone. This phenomenon has already been dealt with in a preceding essay, as a case of simplification; and we now have an opportunity of considering James's objections to our account of it. The first question we must ask is, to what category or categories do the separate sounds and the resultant tone belong, in James's view of them, and according to our own account?

According to our own account, the sounds, when heard separately, are so many apparent things, but, as materials for simplification, they are feelings existing as separate elements in the self; and the resultant musical tone is another apparent thing. But James, denying as he does a soul, has no "feelings" in our sense with which to operate, and the question he asks himself is whether many separate apparent things can be intelligibly said to undergo compounding or integration into a single apparent thing. The answer to this question is clearly in the negative, for us as much as for him. Each apparent thing, product as it is of simplification, and always of the simplification of some special set of elements, is definitively itself and no other. To say that one apparent thing has been transformed into another apparent thing, or that many separate apparent things have been combined into a single one, is to utter words without

meaning. Only by mentioning the conditions under which alone anything appears, conditions belonging to an entirely different category from that of the apparent, can the assertion of a transition from the former to the latter be made intelligible. But James has no conditions, except nervous ones ; and how nervous processes can give birth to feelings he does not inquire, nor does it occur to him to ask what is the nature of the nervous processes considered in themselves.

A still more damaging criticism of James's conception must be made. Granted that the separate sounds and the musical tone to which he refers are objects of awareness : is it perceptive awareness, or introspective awareness, to which they are given ? If it is only perceptive awareness, then both these things are apparent events in the external world, and he has no excuse for speaking of them, as he does, as " feelings ". Only by illicitly including in what appears the appearing or awareness—which yet is no part of what appears—or illicitly fusing the object of introspection, the auditory sensation, with the object of perception, is an apparent thing obtained which can be plausibly spoken of as a " feeling ". The conception of " mental states " or " states of consciousness " current in James's day was a hybrid, got by supposing that at the moment of apprehending an object one can apprehend also one's awareness of it.

When, instead of using Spencer's equivocal term " nervous shocks ", we substitute for it the correct

phrase "elements of sentience", and distinguish these elements properly from the apprehended tones to which they give rise when the external sounds do not follow one another too frequently, as well as from the single tone that is heard when they come with sufficient rapidity—when we do this, Spencer's explanation of musical tones by integration appears perfectly defensible and scientific. For the resulting musical tone is an object of intuition and intent, seized by reacting to the too rapidly successive sensations as a single whole or continuum; reacting thus, because they come too frequently for us to discriminate them (or rather their external causes) one from another, that is, to respond with reactions prompted by the individual elements.

In his next section, headed "Self-compounding of Mental Facts is Inadmissible", James comes to the heart of the question, and deals in many vigorous strokes with that notion of the compositeness of things mental which it is his purpose to combat. We must admit without reserve or qualification that, with respect to the entities which he has in mind and calls "mental facts", he is right in his contention. Though awareness and that of which we are aware—namely, the object, in the more or less simplified form in which it appears—cannot be known at the same time or by means of the same kind of cognition, yet of course there *are* such things as acts of awareness contemplating objects, and of these bi-polar "mental facts" it is true that they are not composite; that is, that two or more of them cannot be put together

so as to form a single one of them, or a single one divided so as to be seen to consist of two or more. For awareness of an object either simple or complex always involves intent, which depends on our reacting appropriately either to a simple or to a complex thing: and two acts involving intent cannot be joined into a single act, any more than two physical responses, each of which requires co-operation of the entire organism, can be joined into a single response.

The impossibility appears clearly in the case cited by James, of two persons, each of whom has an idea, or one of whom sees something while the other hears it. No magic can join their mutually isolated perceptions or ideas, so as to make of them one complex perception or idea—such a perception as a single person has when he at once sees and hears a bell, or such an idea as he has when he thinks of a bell and a belfry together. He can think of these together only by behaving or tending to behave in a way appropriate, not to each separately, but to the two in their spatial and temporal conjunction—the spatial and temporal relation between them being now a part of what he thinks; and this reaction is evidently a different one from that appropriate to either separately, and not simply the sum of the two earlier reactions. He can perceive a bell at once by vision and by hearing, only by reacting to the two stimuli as proceeding from one and the same external thing, and thus taking account of their spatial and temporal conjunction.

“ Let it not be objected ”, says James, “ that H_2 and O combine of themselves into ‘ water ’, and thenceforward exhibit new properties. They do not. The ‘ water ’ is just the old atoms in the new position, H-O-H ; the ‘ new properties ’ are just their combined *effects*. . . . ” “ When the elemental units are supposed to be feelings, the case is in no wise altered. Take a hundred of them, shuffle them and pack them as close together as you can (whatever that may mean) ; still each remains the same feeling it always was, shut in its own skin, windowless, ignorant of what the other feelings are and mean. There would be a hundred-and-first feeling there, if, when a group or series of such feelings were set up, a consciousness *belonging to the group as such* [that is, of them in their spatial and temporal conjunction] should emerge. And this hundred-and-first feeling would be a totally new fact ; the hundred original feelings might, by a curious physical law, be a signal for its *creation*, when they came together ; but they would have no substantial identity with it, nor it with them, and one could never deduce the one from the others, or (in any intelligible sense) say that they *evolved it*. ” “ Idea of a + idea of b is *not* identical with idea of $(a + b)$. It is one, they are two ; in it, what knows a also knows b ; in them, what knows a is expressly posited as not knowing b ; etc. In short, the two separate ideas can never by any logic be made to figure as one and the same thing as the ‘ associated ’ idea. ”

“ This is what the spiritualists keep saying ”, he

continues ; “ and since we do, as a matter of fact, have the ‘ compounded ’ idea, and do know *a* and *b* together, they adopt a farther hypothesis to explain that fact. The separate ideas exist, they say, but *affect* a third entity, the soul. *This* has the ‘ compounded ’ idea, if you please so to call it ; and the compounded idea is an altogether new psychic fact to which the separate ideas stand in the relation, not of constituents, but of occasions of production.”

All this seems to me as perfectly true as it is admirably expressed ; and what I find regrettable is that James did not proceed to work out the problem on these lines. I think I understand why he did not do so. The “ undertow of reasons drawing us back to a soul ” ceased to influence him, because he conceived the soul as necessarily simple and indivisible, and his empiricism led him more and more to disbelieve in real things distinct in any way from apparent ones. On the other hand, he became more and more convinced, as time went on, that consciousness—that “ mere echo ” or “ faint rumour left behind by the disappearing ‘ soul ’ upon the air of philosophy ”—was not an observable datum. He ceased to have an “ I ” that knows, a “ knower ”, in any way distinct from the objects immediately known. With that lapse from truth, the possibility of explaining ideas by composition, and at the same time of understanding the connexion of mind and body and the origin of consciousness, was denied him. To the evolutionary psychologist’s demand for a mind-stuff he can henceforth only oppose a blind but resolute No.

James was nearer to the true solution of the problem when he spoke of the "undertow of reasons drawing us back to the soul". But why did he then not remember Kant's proof of the fallacy of arguing from the unity of apperception to a soul that was simple and indivisible? Kant here showed himself the deeper connoisseur of the mind. The psychical existent that knows, and which by turns we call soul, self, subject, does not need to be one in order that its knowing may have unity. It is the same existent that appears to the senses as the body, and therefore as multiple spatially and temporally as the body is. Only because it is composed of a plurality of sensations are we able to see and hear simultaneously, or to see objects without confusion as consisting of many distinct parts. It is to these sensations that the compositeness, and the possibility of addition and subtraction, alone applies. They are added only so far as several sensations unitedly prompt to a reaction, and subtracted only so far as they prompt to reactions severally.

The groups of sensations that appear to the senses as the nervous processes of different persons cannot unite to convey a single object, because they cannot prompt to a single reaction on the part of the two separate organisms. The group of sensations appearing as a single nervous process *can* prompt to a single reaction of the organism to which they belong, and therefore *can* become the vehicle of a single intuition and intent. They can do so in virtue of their spatial and temporal connectedness. They consist ultimately

of the elements of feeling in points, at instants ; between the elements in adjacent points there are junctions, enabling them to co-operate or strive together ; their co-operation or joint striving causes the arrival of the next instant, in which the elements of feeling are differently arranged—causes, in other words, that *change* without which the real would not be a living process. When this process has the form of an animal organism, and the events in its sensory parts lead to reactions of its motor parts, and these to other sensations by means of which the reactions are felt, all the necessary conditions are present for the rise of an act of awareness. The existential distinctness of the sensations from one another—of the visual, auditory, and tactile from the muscular sensations, and of the parts of each of these from one another—so far from being an obstacle to their joint action, is necessary to its being different in different cases, and to the act of awareness being as selective and as clearly discriminative as we find it actually to be. Souls, *in their cognitive activity*, are indivisible : but they could not know in the complex and yet discriminating way in which they do know, if, as existents, they were simple.

James continues : “ This argument of the spiritualists against the associationists has never been answered by the latter. It holds good against any talk about self-compounding amongst feelings, against any ‘blending’, or ‘complication’, or ‘mental chemistry’, or ‘psychic synthesis’, which supposes a resultant consciousness to float off from the constituents *per se*.

in the absence of a supernumerary principle of consciousness which they may affect. The mind-stuff theory, in short, is unintelligible. Atoms of feeling cannot compose higher feelings, any more than atoms of matter can compose physical things! The 'things', for a clear-headed atomistic evolutionist, are not. Nothing is but the everlasting atoms. When grouped in a certain way, *we* name them this 'thing' or that; but the thing we name has no existence out of our mind. So of the states of mind which are supposed to be compound because they know many different things together. Since indubitably such states do exist, they must exist as single new facts, effects, possibly, as the spiritualists say, on the Soul (we will not decide that point here), but at any rate independent and integral, and not compounded of psychic atoms."

When James sums up his discussion in these trenchant words, our verdict can only be that his ideas concerning mind-stuff are a singular compound of truth and error. Let us grant that in quantity and importance the truth far exceeds the error. Yet it is a capital mistake thus to reject an hypothesis which is indispensable to evolutionary psychology; and we have seen why, by the logic of his own erroneous theory of knowledge, he is forced to do so. He is right to reject the compounding of "states of consciousness"—that is, of acts of awareness and of the things that appear to them. He is wrong, and grievously wrong, in rejecting the compounding of feelings in the self.

III

Unconscious Mental States

There follows in James's chapter a long passage devoted to exposing the contradiction he considers to be involved in the notion of "unconscious mental states". Our distinction between awareness and feeling puts us in a position to rectify this judicial error also.

For, if feelings are distinct from the acts of awareness which, when combined with a suitable reaction, they make possible—if they are *existents* (and their nature the nature of the existent), whereas the acts in question are only *functions*—there is no longer any reason why feelings may not exist outside a consciousness or mind. Indeed, only by the assumption of feelings so existing can light be thrown on the process by which Nature is able to produce minds. We might, of course, choose the alternative of declaring this process inexplicable and magical, and assert, with the stultifying combination of nescience and assurance of the German physiologist, *ignoramus et ignorabimus*. But why, after men of science have succeeded in discovering the chemical elements of which the stars are composed, the compositeness of these elements in all matter, the non-ultimateness of biological species, and many a clarifying fact about the action of the nervous system, should we give up the hope of understanding even the origin of the mind, because, forsooth, the problem looks harder? There can be

no question which choice men of truly scientific temper will make.

Convinced that he has disposed of the mind-stuff theory *in any form*, and unaware that his refutation of it rests on a conception of "mental states" or "states of consciousness" that cannot be upheld—the conception, that is to say, that what we are aware of and our awareness of it are given together as a single datum—James is led, in the section entitled "Can States of Mind be Unconscious?" to use strong language. I will not say that, in the enthusiasm of his denunciation of the poor mind-stuffists, he lets fly at them a stream of philosophical billingsgate; but only that, in condemning them, he uses expressions of too great vivacity. "The passion for unity and smoothness is in some minds [Darwin's, for instance] so insatiate that, in spite of the logical clearness of these reasonings and conclusions, many will fail to be influenced by them. They establish a sort of disjointedness in things which in certain quarters will appear intolerable. They sweep away all chance of 'passing without break' either from the material to the mental, or from the lower to the higher mental; they thrust us back into a pluralism of consciousnesses—each arising discontinuously in the midst of two disconnected worlds, material and mental—which is even worse than the old notion of the separate creation of each particular soul. But the malcontents will hardly try to refute our reasonings by direct attack. It is more probable that, turning their back on them altogether, they will devote themselves to

sapping and mining the region round about until it is a bog of logical liquefaction, into the midst of which all definite conclusions of any sort may be trusted ere long to sink and disappear. Our reasonings have assumed that the 'integration' of a thousand psychic units must be either just the units over again, simply rebaptised, or else something real, but then other than and additional to those units; that if a certain existing fact is that of a thousand feelings, it cannot at the same time be that of ONE feeling; for the essence of feeling is to be felt, and as a psychic existent *feels*, so it must *be* [true enough, whether said of the apparent thing, or of the state of the soul which *we* call 'feeling']. If the one feeling feels like no one of the thousand, in what sense can it be said to *be* the thousand? These assumptions are what the monists will seek to undermine. . . . [Then follows a short passage about 'the Hegelisers' among them, which I omit.] The other monists are of a less deliquescent frame, and try to break down distinctness among mental states by *making a distinction*. . . . The distinction is that *between the unconscious and the conscious being of the mental state*. It is the sovereign means for believing what one likes in psychology, and of turning what might become a science into a tumbling-ground for whimsies."

Not so, dear James. You misconceive the distinction, because you think that there is something which is at once *what* we are conscious of and our consciousness of it, and you rightly assert that, if the consciousness were stripped away from such a

thing, nothing would be left. Your idea of the science which psychology might become is that of a discipline restricting itself to "mental states" as you conceive them and to their analysis, and connecting them with the rest of the world only by correlating them with the nervous processes on which they are dependent, but without any attempt to understand what the real nature of these nervous processes is or how the "mental states" come to be conjoined with them. This is the direct negation of an evolutionary psychology.

The distinction, properly understood, is that between the *being* of feelings, as existents with a certain nature and a certain complex arrangement, and the *function* they exercise in enabling us to know other things than themselves, the function of awareness; and exists just as much in the case of feelings by means of which we are conscious, as in that of feelings which have no awareness connected with them. This distinction is exactly parallel to that between the being of a nervous event (say, the nervous event correlated with the feeling), as a physical process not essentially different from any other, a mere "dance of atoms" or minuet of electrons, and the function which this nervous event may subserve in adjusting the organism to objects outside it. Indeed, it is by reflecting on the physical difference, and inferring that, if the physical is, as such, only apparent, there must be a corresponding psychical difference, that the evolutionary psychologist is led to assert the distinction between feeling and awareness.

If feeling and awareness are distinct, then feelings are capable of existence when they mediate no awareness. The relation of such *unconscious feelings* to the conscious ones composing the self at any moment of awareness is to be understood by considering the relation between the corresponding physical events or objects—in accordance with the “physical method”.

When we apply this method in a thoroughgoing way, the difference on the physical side between processes and functions at once justifies the distinction between feeling and awareness. But there is another physical difference, namely, that between processes and objects, between events and more or less permanent things—illustrated, in the case of the physical facts nearest to psychology, by the difference between the brain as an object and the processes occurring in it—which may be thought to involve a difficulty for our theory. We think of feelings as corresponding to processes—whether in the brain or, according to the altered view of the seat of sensation suggested above, also in the sense-organs—not to permanent objects. Are we then to suppose that these objects, too, have as their mental accompaniment or inner being feelings? If so, at least these feelings must differ as much from the feelings correlated with processes as physical objects differ from physical processes. What can be said to relieve this difficulty?

The evolutionary psychologist may derive aid and comfort here by recalling that contemporary physics reduces all physical facts to “events”—

that is, to redistributions of energy. Our analysis of events into series of instantaneous *states* in no way alters the fact that these states are always joined together in the form of events. When, therefore, physicists tell us that there is no ultimate difference of kind between physical processes and physical objects, but that the objects themselves consist of processes—processes that merely repeat themselves without change—this warrants us in saying that, on the psychical side, there need be no ultimate difference of kind between the feelings corresponding to nervous events and those corresponding to the cells and fibres in which these events occur: though there will of course be a great difference of arrangement, and especially in the permanence of the arrangement. These suggestions will seem excessively schematic and abstract; but how can we go beneath the familiar world of the apparent, and explain the conditions on which it rests, except by employing abstractions and schemes of them?

Now let us take up James's detailed arguments against unconscious mental states, and see what reply to them can be made. He cites ten different supposed proofs of such states, and refutes them *seriatim*; but it will not be necessary for us to take up his arguments one by one, since they are refutations of two different conceptions: (1) that of states of consciousness which are unconscious, and (2) that of unconscious feelings.

Those of his arguments which are addressed to the former conception we can only agree with and

applaud. It is what is happily called a contradiction in terms. But this is not what the advocates of unconscious mental states really meant. They meant that feelings of which we are not aware may make us aware ; and that feelings which do not mediate awareness, but are “ beyond the circle of consciousness ”, may nevertheless exist. In other words, their conception was the second mentioned above. Now it is quite true that an act of awareness cannot consist of smaller acts, for the reason that every such act rests on a reaction, and the organism cannot at one moment react except in one way. This reaction may be a synthesis of simpler reactions, but only in the sense that the simpler reactions preceded it and made it possible. When I have learned to swim, I no longer attend to the part-movements that are necessary for swimming, but only to the total movement they form ; and, in the same way, when I think of a complex object, I do not have many thoughts addressed to its parts, but one complex thought addressed to the whole. The arrangement of the parts is included in that of which I think ; and it could not be included, if my thought were merely a composite of thoughts each dealing only with a part. My reaction is to the parts *in their arrangement* : the object conveyed, though complex, is therefore single and indivisible. But this is in no way inconsistent with the fact that this complex object is brought before me by a complex of feelings which *is* composite and divisible, and of which at the moment I am not aware.

This section of James's chapter is a direct frontal

attack on the distinction between feeling and awareness which is our main weapon ; and we must therefore not leave the subject before having illuminated it thoroughly. The motive underlying his attack is an inability to conceive feeling otherwise than in terms of awareness.

James's own distinction between " the thought " and its " object "—so clearly set forth in the chapter following this (vol. i, p. 184)—should have preserved him from the notion that the thought, besides having an object, say, in the external world, has also, for a secondary object, itself : which is what is implied in the traditional conception of " states of consciousness " or " mental states ". If, in point of fact, " the thought " is always un-self-conscious—and if consciousness is, as James himself maintains, an external function—then such a thought is what is here meant by a " feeling ". The notion of feelings as necessarily self-conscious is due partly to looseness in conceiving the object of which they are conscious, through failure to decide whether what they are conscious of is solely the external thing, or, in addition, themselves ; and partly to failure to see that awareness is an external function, which always (even in introspection) transports the knower beyond the state by means of which he knows, and into the presence of the object, whatever it is, that is known.

No feeling, at the moment when it exists, is ever aware of itself. Its unawareness of itself does not prevent it from being a feeling—that is, from being what introspection finds, and from having the nature

which introspection finds, in the rare cases in which introspective attention is turned upon it. This is realism applied to introspection.

In a section towards the end of his chapter, on the "Difficulty of Stating the Connexion between Mind and Brain", James makes the true remark that, before any attempt can be made to explain their connexion, we must accurately state it, saying what cerebral facts are directly correlated with particular mental facts; and, recognising the extreme manyness on both sides of the correlation, seems for a moment on the point of coming to a pluralistic view of the self, such as that here maintained. But this momentary glimpse of the truth fades away under the pressure of a great fact—the "unity of consciousness"—which his own analysis does not put him in a position to understand; and, under pressure of this great fact, spellbound also by the prestige of the "Soul" (the simple and indivisible one), he is soon headed away in the direction of that great prejudice. Why, oh why, did James not remember Kant's disproof of the validity of reasoning from the unity of consciousness to the simplicity and indivisibility of the soul?

"Acts of awareness are not composite": yes. Feelings "*are* eternally as they feel when they exist": yes, again. But that feelings *are* either acts of awareness or essentially data of awareness, or that they are aware of themselves, or that they cannot exist unless there is awareness of them—NO. That is a fundamental error, which would make an evolutionary

psychology, or any complete explanation of the nature of the mind and its relation to the body, impossible.

James concludes his argument with the statement that the mind-stuff theory, "though scotched", is "not killed", and that "'man's unconquerable mind' will devote much future pertinacity and ingenuity to setting it on its legs again. . . ." (p. 178) A true prophecy. How far the present attempt to do so has succeeded, must be left to the judgement of the reader. The weapons which I have used for the purpose are James's denial that consciousness is an observable datum and his assertion that it is an external function. If I have indeed refuted his refutation, I have done it with arms which he himself has furnished.

